

Birds of Estação Ecológica da Serra das Araras, state of Mato Grosso, Brazil: additions and review

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Abstract

We present an inventory, followed by a consolidated list, for the avifauna of Estação Ecológica da Serra das Araras (EESA), state of Mato Grosso, Brazil. In our expeditions, we identified 287 species, 82% of them documented. Of these, 28 species are new records for EESA. Six are threatened, such as *Lophornis gouldii* (Lesson, 1832). Other noteworthy records include the first documentation of *Oxyruncus cristatus* Swainson, 1821, for Mato Grosso. The consolidated list includes 458 species, of which 255 were assigned to the primary list and 203 to the secondary list. The significant number of species compiled herein places EESA among the most species-rich protected areas of Brazil, especially in regard to areas not predominantly covered by forest. In terms of species composition, this is a community typical of an ecotone environment, featuring many species characteristic of the Cerrado and the Amazon and some of the Pantanal wetland.

Key words

Neotropical birds; ornithological survey; biogeography; biodiversity; ecotone; protected area; Província Serrana.

Academic editor: Galo Buitrón-Jurado | Received 14 April 2018 | Accepted 25 August 2018 | Published 26 October 2018

Citation: Vitorino BD, Frota AVB, Castrillon SKI, Nunes JRS (2018) Birds of Estação Ecológica da Serra das Araras, state of Mato Grosso, Brazil: additions and review. Check List 14 (5): 893–922. <https://doi.org/10.15560/14.5.893>

Introduction

The Estação Ecológica da Serra das Araras (EESA) is a protected area, created by decree 87.222 of 1982, in southwestern Mato Grosso state, Brazil. Due to its location in an area bordering Bolivia, it is highlighted in the international context (Brazil 2016a). The main objective of the EESA is to preserve nature in accordance with Federal Law 9.985 of 2000, which establishes criteria and

norms for the creation, implementation and management of protected areas in Brazil. Among the benefits of its creation according to Hassler (2005), can be highlighted as follows: biodiversity and ecological processes conservation, maintenance of water resources, improvement in air quality, water and soil.

With regard to avifauna, EESA has had 5 studies so far. Silva and Oniki (1988), Willis and Oniki (1990),

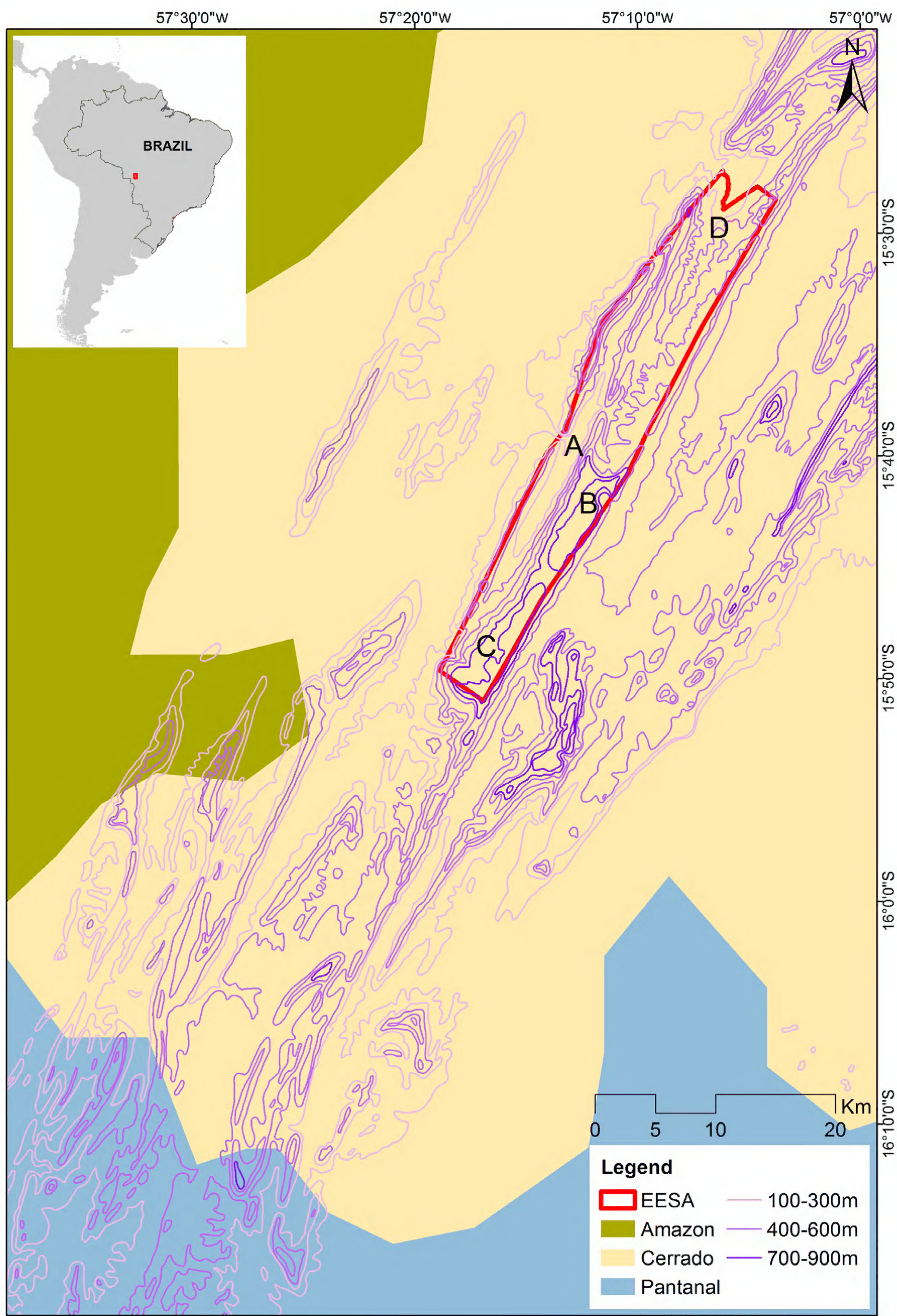


Figure 1. Location of Estação Ecológica da Serra das Araras (EESA), state of Mato Grosso, Brazil, with isolines representing the Província Serrana elevational gradient.

Oniki and Willis (1999) and Oniki and Oliveira (2002) present data collected in expeditions undertaken from 1986 to 1988, while Valadão (2012) presents data collected

in 2006 and 2007 that also make up the EESA management plan (Brazil 2016a). These works provide relevant information on the occurrence of several species in the

region, including many noteworthy records, especially of *Columbina cyanopis* (Pelzeln, 1870), one of the rarest birds in the world (Silva and Oniki 1988, Valadão 2012).

Although the avifauna of EESA is relatively well known, the making of a new inventory 10 years after the last one allows an historical evaluation of the bird community and adds relevant information to the ongoing understanding of ecological patterns and distribution of the species involved. We aim to present an up-to-date inventory of the bird species that occur in EESA, followed by a compilation and review of the bird records for the EESA, as until now this protected area lacked a consolidated list based on standardized criteria.

Methods

Study area. The EESA is a 28,700 ha protected area mostly situated in Porto Estrela Municipality and, to a lesser degree, in Cáceres Municipality, state of Mato Grosso, Brazil. It is located in the geomorphological unit of Província Serrana, a corridor of parallel mountain in the Cerrado in transition with the Pantanal wetland and Amazon (Brazil 2016a). The climate is considered Aw in the Köppen classification, with annual rainfall around 1500 mm and maximum and minimum average temperatures around 32 °C and 20 °C, respectively (Kottek et al. 2006). EESA presents high environmental heterogeneity, including savanna, forest and grassland formations (Brazil 2016a). To cover a greater number of EESA habitats, we concentrated the bird survey in 4 sampling areas, A, B, C and D (Fig. 1).

Area A: central region of the Salobra river valley, where the EESA headquarters are located (15°39'10.96" S, 057°12'52.54" W) (Fig. 2A). It consists of a vegetation mosaic comprising semideciduous seasonal forest with areas dominated by *Attalea speciosa* Mart. Ex Spreng, the savanna-like *cerrado sensu stricto* (Fig. 2b), riparian forest and a small human-altered area surrounding the EESA headquarters. The area is under the influence of the Camarinha and Salobinha rivers. The elevation is around 225 m, with no great variation.

Area B: region situated on the upper eastern part that forms the Salobra River valley and includes Cabeceira do Teófilo (15°39'15" S, 057°09'57" W) and Cachoeira da Andorinha (15°41'05.05" S, 057°12'30" W). Predominant vegetation is *cerrado sensu stricto* (Fig. 2C); open *cerrado*, small areas of *cerrado rupestre* (a type of *cerrado* that grows on rocky terrain), riparian forest and lower montane forest formations are also present. The elevation ranges from 500 to 650 m, with the higher parts located on the eastern part of EESA. Around Cachoeira da Andorinha lies the EESA's largest area of *campo limpo* (open grassland) (Fig. 2D). The region also harbors areas of *cerrado rupestre*, *campo sujo* (grassland with shrubs and scattered small trees) and open *cerrado*. The elevation ranges from 750 to 860 m.

Area C: southern part, known as Jauquara region, due to the nearby river of the same name. The environ-

ments sampled encompass formations with rock outcrops (15°46'30" S, 057°15'16" W) (Fig. 2E), farmland located at the EESA's southernmost region (15°49'40" S, 057°17'20" W), *cerrado sensu stricto*, *campo sujo* and lower montane forest. The elevation ranges from around 700 to 850 m.

Area D: northern part, strongly influenced by the Três Ribeirões River (15°28'56" S, 057°05'42" W). Predominant vegetation formations are deciduous seasonal forest (Fig. 2F) and semideciduous seasonal forest (Fig. 2G) with areas dominated by *A. speciosa* (Fig. 2H), areas of *cerrado sensu stricto* and riparian forest. The elevation ranges from 250 to 500 m.

Data collection and analysis. Additions. We call additions the contributions resulting from our field sampling (*in situ*). All fieldwork was conducted under the proper permits: Sistema de Autorização e Informação em Biodiversidade/Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis (54984-1), Centro Nacional de Pesquisa e Conservação de Aves Silvestres (4156/1) and Comitê de Ética em Pesquisas com Animais da Universidade do Estado de Mato Grosso (009/2016).

We collected data from October 2016 to September 2017. We identified bird species by sight and sound, using 10 × 40 binoculars, photo cameras, a digital audio recorder and specialized literature such as Sick (1997) and del Hoyo et al. (2017). Whenever possible, we documented bird species with photographs and audio recordings, which were archived on Xeno-canto (<https://www.xeno-canto.org>), Wikiaves (<http://www.wikiaves.com.br>) and Macaulay Library (<https://www.macaulaylibrary.org>). We also collected some specimens and deposited them in the ornithological collection of Universidade Federal de Mato Grosso (UFMT).

For the survey, we used 3 complementary methods: transect (Bibby et al. 2000), capture with mist nets (Karr 1981, Keyes and Grue 1982, Roos 2010) and MacKinnon lists (MacKinnon 1991, Herzog et al. 2002).

Transect: in Area A, we set up a 3.5 km trail running across *cerrado sensu stricto*, riparian forest and semideciduous seasonal forest habitats. This trail was sampled 38 times throughout the year, 19 in the dry season and 19 in the wet season. Each sampling lasted on average 3 hours, amounting to a total effort of about 110 hours. We considered as records all the specimens detected at a distance of up to about 50 m from the observer.

Capture with mist nets: we defined 4 plots in Area A (P1, P2, P3 and P4) covering different phytophysognomies (Table 1). Each plot was sampled for 2 consecutive days per month over a period of 1 year. We used 7 mist nets (12 × 3 m; 20 mm mesh) in each plot for 5 hours per day, totaling 30,24 m²h (Straube and Bianconi 2002). Capture procedure followed Brazil (1994).

MacKinnon lists: in Areas B, C and D we surveyed the birds by making MacKinnon lists with 10 species, walking along pre-existing trails in the morning, afternoon and occasionally at night. Total number of lists obtained for each area was 32, 36 and 42, respectively.



Figure 2. **A.** Central region of the Salobra River valley (Area A). **B.** Cerrado *sensu stricto* (Area A). **C.** Cerrado *sensu stricto* (Area B). **D.** *Campo Limpo* (Area B). **E.** Rocky formations (Area C). **F.** Deciduous seasonal forest (Area D). **G.** Semideciduous seasonal forest (Area A). **H.** Seasonal forest dominated by *Attalea speciosa* Mart. ex Spreng (Area D). (Photos: BDV).

We defined frequency of species occurrence (FO) as the number of samples where a given species was recorded divided by the total number of samples, according to D’Angelo Neto et al. (1998). We also included randomly recorded species when putting together the species list.

Birds of Estação Ecológica da Serra das Araras: review. This review and compilation work aims to generate a standardized list and increase the credibility of the EESA species list, according to the guidelines laid down by the Brazilian Ornithological Records Committee (Piacentini et al. 2015). We combined the results of our inventory for EESA with occurrence records from the literature (Silva and Oniki 1988, Willis and Oniki 1990, Oniki and Oliveira 2002, Valadão 2012) and 2 species mentioned exclusively in the management plan (Brazil 2016a). We did not include the species cited in Oniki and Willis (1999), as record localities were imprecise. We also searched for documented records in scientific collections (UFMT, Museu Paraense Emílio Goeldi, Museu de Zoologia da Universidade de São Paulo, Universidade Católica de Minas Gerais, Universidade Federal de Minas Gerais, Universidade Federal do Rio de Janeiro and Instituto Nacional de Pesquisas da Amazônia) and in the databases Wikiaves, Xeno-canto and Macaulay Library (accessed in March 2018). Each species listed was then assessed and assigned to 1 of 3 different lists:

Primary list: includes species with occurrence records in EESA with at least one documented evidence item, in the form of either a complete or a partial specimen, a photograph or a sound recording. Documented evidence must provide a trustworthy diagnosis of the taxon in question and be available for reassessment.

Secondary list: includes species with occurrence records at EESA for which documented evidence is unknown or unavailable. These species were considered of “probable occurrence” at the EESA, based on currently known distribution and dispersal patterns.

Tertiary list: includes species with occurrence records at EESA for which evidence is questionable, invalid or non-existent, and whose occurrence at the EESA seems improbable in the light of current knowledge. These species were excluded from the consolidated list.

The consolidated list is thus composed of species from the primary and secondary lists. Presentation of the evidence of records listed for EESA was based on Carlos et al. (2010) and used: “Indication of Occurrence” for species recorded in the field but not documented, either in our field inventory or in inventories available in

the literature; “A-level documentation” for species with specimens deposited in scientific collections; “B-level documentation” for species documented with photographs or audio recordings. Species conservation status follows the executive summary of the Brazil Red Book of Threatened Species of Fauna (Brazil 2016b) at the national level and the Red List of Threatened Species (IUCN 2017) at the global level. For Cerrado endemics, we followed Silva (1995), Cavalcanti (1999), Sick (1997) and Silva and Bates (2002). For taxonomic classification, we followed Piacentini et al. (2015).

Results

Additions. During the *in situ* sampling, we recorded a total of 287 bird species, 270 through systematic sampling and 17 through random observations. Out of them, 236 (82% of the total) are documented in this article with vouchers. Systematically, richness for area A equaled 195 species, with 186 recorded during the transect and 79 captured with mist nets. For areas B, C and D, 114, 128 and 111 species were recorded with the MacKinnon lists, respectively (Table 2).

Analyzing the data we obtained with the transect method, the species with the highest frequency of occurrence (FO) indices in relation to the transects were *Basileuterus culicivorus* (Deppe, 1830) (FO = 1.0), *Formicivora grisea* (Boddaert, 1783) (FO = 0.97), *Thamnophilus pelzelni* Hellmayr, 1924 (FO = 0.97), *Neopelma pallescens* (Lafresnaye, 1853) (FO = 0.97), *Pipra fasciicauda* Hellmayr, 1906 (FO = 0.97) and *Myiothlypis flaveola* Baird, 1865 (FO = 0.97). Analyzing the captures, the most frequent species was *P. fasciicauda* (FO = 1.00), followed by *N. pallescens* (FO = 0.92). In terms of MacKinnon lists in area B, the most frequent species were *Euphonia chlorotica* (Linnaeus, 1766) (FO = 0.34) and *Patagioenas speciosa* (Gmelin, 1789) (FO = 0.31); in area C, *Myrmophylax atrothorax* (Boddaert, 1783) (FO = 0.50) and *Hypocnemis ochrogyna* Zimmer, 1932 (FO = 0.46); in area D, *Tangara sayaca* (Linnaeus, 1766) (FO = 0.37), *Eupsittula aurea* (Gmelin, 1788) (FO = 0.30) and *Cyclarhis gujanensis* (Gmelin, 1789) (FO = 0.30).

Of the species we recorded, 28 are new records for EESA. We found 4 Near Threatened species and 6 Vulnerable species and recorded 6 species endemic to Cerrado. Below, we present accounts for these species, as well as some noteworthy records.

Table 1. Predominant phytophysionomies of the plots sampled with mist nets at Estação Ecológica da Serra das Araras, state of Mato Grosso, Brazil and respective geographical coordinates.

Plot	Predominant phytophysionomy	Latitude (S)	Longitude (W)
P1	Semideciduous seasonal forest	15°39'0.94"	057°12'42.73"
P2	Cerrado <i>sensu stricto</i>	15°39'20.06"	057°12'57.65"
P3	Gallery forest	15°39'44.49"	057°13'12.99"
P4	Cerrado <i>sensu stricto</i> with gallery forest influence	15°39'53.59"	057°13'31.92"

Table 2. List of birds recorded at Estação Ecológica da Serra das Araras, state of Mato Grosso, Brazil from October 2016 to September 2017. VU* = Vulnerable (Brazil 2016b); VU = Vulnerable (IUCN 2016); NT = Near Threatened; CE = cerrado endemic; (FO) = frequency of species occurrence for area (T, based on transect method and M, based on capture with mist nets method). Species without FO information were recorded randomly. Catalog numbers in Voice and Photo columns are hyperlinked to the the online databases: Xeno-canto, WikiAves, or Macaulay Library.

Taxon name	English name	Vouchers			Area				
		Specimen	Voice	Photo	A (FO) T	A (FO) M	B (FO)	C (FO)	D (FO)
Rheiformes									
Rheidae									
<i>Rhea americana</i> (Linnaeus, 1758) NT	Greater Rhea			WA2737752				0.03	
Tinamiformes Huxley, 1872									
Tinamidae									
<i>Tinamus tao</i> Temminck, 1815 VU, VU*	Gray Tinamou				0.37		0.03	0.03	0.4
<i>Crypturellus soui</i> (Hermann, 1783)	Little Tinamou		XC400315		0.37			0.07	
<i>Crypturellus undulatus</i> (Temminck, 1815)	Undulated Tinamou		XC387954		0.58		0.09	0.10	0.13
<i>Crypturellus parvirostris</i> (Wagler, 1827)	Small-billed Tinamou		XC400253				0.03	0.07	
<i>Crypturellus tataupa</i> (Temminck, 1815)	Tataupa Tinamou		XC404460	WA2760485	0.11				0.4
<i>Rhynchotus rufescens</i> (Temminck, 1815)	Red-winged Tinamou		XC400254	WA2739639			0.03	0.27	
Galliformes									
Cracidae									
<i>Penelope superciliaris</i> Temminck, 1815	Rusty-margined Guan			WA2890256	0.11		0.03	0.10	0.02
<i>Aburria kujubi</i> (Pelzeln, 1858)	Red-throated Piping-Guan			WA2741413	0.03				
<i>Ortalis canicollis</i> (Wagler, 1830)	Chaco Chachalaca				0.08				
<i>Crax fasciolata</i> Spix, 1825 VU	Bare-faced Curassow		XC402823	WA2742645	0.24			0.07	0.4
Odontophoridae									
<i>Odontophorus gujanensis</i> (Gmelin, 1789) NT	Marbled Wood-Quail		XC400324		0.26			0.07	0.02
Podicipediformes									
Podicipedidae									
<i>Tachybaptus dominicus</i> (Linnaeus, 1766)	Least Grebe			WA2732381				0.07	
Ciconiiformes									
Ciconiidae									
<i>Jabiru mycteria</i> (Lichtenstein, 1819)	Jabiru								
<i>Mycteria americana</i> Linnaeus, 1758	Wood Stork			WA2737798			0.06	0.03	
Pelecaniformes									
Ardeidae									
<i>Tigrisoma lineatum</i> (Boddaert, 1783)	Rufescent Tiger-Heron								
<i>Agamia agami</i> (Gmelin, 1789) VU	Agami Heron								
<i>Bubulcus ibis</i> (Linnaeus, 1758)	Cattle Egret								
Threskiornithidae									
<i>Mesembrinibis cayennensis</i> (Gmelin, 1789)	Green Ibis				0.05				
<i>Theristicus caudatus</i> (Boddaert, 1783)	Buff-necked Ibis			WA2742651				0.03	
Cathartiformes									
Cathartidae									
<i>Cathartes aura</i> (Linnaeus, 1758)	Turkey Vulture			WA2722294	0.03		0.09		0.4
<i>Cathartes burrovianus</i> Cassin, 1845	Lesser Yellow-headed Vulture								
<i>Cathartes melambrotus</i> Wetmore, 1964	Greater Yellow-headed Vulture								
<i>Coragyps atratus</i> (Bechstein, 1793)	Black Vulture			WA2731330	0.05		0.13	0.07	0.02
<i>Sarcoramphus papa</i> (Linnaeus, 1758)	King Vulture			WA2470868	0.08		0.13		0.4
Accipitriformes									
Accipitridae									
<i>Leptodon cayanensis</i> (Latham, 1790)	Gray-headed Kite								0.02
<i>Chondrohierax uncinatus</i> (Temminck, 1822)	Hook-billed Kite			WA2403490	0.03				
<i>Harpagus bidentatus</i> (Latham, 1790)	Double-toothed Kite								
<i>Harpagus diodon</i> (Temminck, 1823)	Rufous-thighed Kite			WA2858435	0.03				
<i>Accipiter superciliosus</i> (Linnaeus, 1766)	Tiny Hawk				0.05				
<i>Accipiter bicolor</i> (Vieillot, 1817)	Bicolored Hawk				0.03				
<i>Ictinia plumbea</i> (Gmelin, 1788)	Plumbeous Kite			WA2731340			0.06	0.03	
<i>Urubitinga urubitinga</i> (Gmelin, 1788)	Great Black Hawk			WA2731342					0.02
<i>Rupornis magnirostris</i> (Gmelin, 1788)	Roadside Hawk		XC404561	WA2733685	0.32		0.03	0.17	
<i>Geranoaetus albicaudatus</i> (Vieillot, 1816)	White-tailed Hawk			WA2722298	0.03		0.03	0.03	
<i>Pseudastur albicollis</i> (Latham, 1790)	White Hawk			WA2884986	0.03				
<i>Buteo nitidus</i> (Latham, 1790)	Gray-lined Hawk			WA2732377				0.03	0.02
<i>Spizaetus tyrannus</i> (Wied, 1820)	Black Hawk-Eagle			WA2885005					
<i>Spizaetus ornatus</i> (Daudin, 1800) NT	Ornate Hawk-Eagle		XC400234		0.08		0.03		
Eurypygiiformes									
Eurypygidae									
<i>Eurypyga helias</i> (Pallas, 1781)	Sunbittern		XC400205	WA2739643	0.03				
Gruiformes									
Rallidae									
<i>Aramides cajaneus</i> (Statius Müller, 1776)	Gray-necked Wood-Rail				0.03				0.02

Taxon name	English name	Vouchers			Area				
		Specimen	Voice	Photo	A (FO) T	A (FO) M	B (FO)	C (FO)	D (FO)
<i>Mustelirallus albicollis</i> (Vieillot, 1819)	Ash-throated Crake		XC400268					0.03	
Charadriiformes									
Charadriidae									
<i>Vanellus chilensis</i> (Molina, 1782)	Southern Lapwing			WA2742650	0.03			0.07	
Jacanidae									
<i>Jacana jacana</i> (Linnaeus, 1766)	Wattled Jacana			WA2760489				0.03	
Columbiformes									
Columbidae									
<i>Columbina talpacoti</i> (Temminck, 1810)	Ruddy Ground-Dove			WA2731329				0.13	0.02
<i>Columbina squammata</i> (Lesson, 1831)	Scaled Dove			WA2731329			0.03		
<i>Claravis pretiosa</i> (Ferrari-Perez, 1886)	Blue Ground-Dove		XC400177	WA2760487	0.24	0.08			
<i>Patagioenas speciosa</i> (Gmelin, 1789)	Scaled Pigeon			WA2742647	0.47		0.31	0.17	0.13
<i>Patagioenas picazuro</i> (Temminck, 1813)	Picazuro Pigeon				0.03			0.07	0.02
<i>Patagioenas cayennensis</i> (Bonnaterre, 1792)	Pale-vented Pigeon			WA2732454	0.03		0.03	0.13	0.02
<i>Patagioenas plumbea</i> (Vieillot, 1818)	Plumbeous Pigeon		XC400175	WA2850097	0.84		0.09		0.28
<i>Leptotila verreauxi</i> Bonaparte, 1855	White-tipped Dove		XC387962	WA2741416	0.71	0.08	0.19	0.23	0.09
<i>Leptotila rufaxilla</i> (Richard & Bernard, 1792)	Gray-fronted Dove		XC404589	WA2741417	0.34		0.06		0.09
<i>Geotrygon montana</i> (Linnaeus, 1758)	Ruddy Quail-Dove			WA2760483	0.11				
Cuculiformes									
Cuculidae									
<i>Piaya cayana</i> (Linnaeus, 1766)	Squirrel Cuckoo			WA2866108	0.50		0.16	0.03	
<i>Coccyzus euleri</i> Cabanis, 1873	Pearly-breasted Cuckoo								
<i>Crotophaga ani</i> Linnaeus, 1758	Smooth-billed Ani		XC400252	WA2857389				0.07	0.02
<i>Guira guira</i> (Gmelin, 1788)	Guira Cuckoo			WA2739640				0.07	
<i>Dromococcyx pavoninus</i> Pelzeln, 1870	Pavonine Cuckoo		XC400266		0.05			0.03	0.02
Strigiformes									
Strigidae									
<i>Megascops choliba</i> (Vieillot, 1817)	Tropical Screech-Owl		XC387966				0.03		
<i>Megascops usta</i> (Sclater, 1858)	Austral Screech-Owl		XC400323		0.08				
<i>Pulsatrix perspicillata</i> (Latham, 1790)	Spectacled Owl		XC400215	WA2732382	0.08				0.02
<i>Strix virgata</i> (Cassin, 1849)	Mottled Owl				0.03				
<i>Glaucidium brasilianum</i> (Gmelin, 1788)	Ferruginous Pygmy-Owl		XC404263		0.24		0.03	0.03	
<i>Athene cunicularia</i> (Molina, 1782)	Burrowing Owl			WA2732378				0.03	
<i>Asio clamator</i> (Vieillot, 1808)	Striped Owl		XC404556	WA2741414			0.03		
Nyctibiiformes									
Nyctibiidae									
<i>Nyctibius griseus</i> (Gmelin, 1789)	Common Potoo			WA2741362	0.08		0.03	0.03	
Caprimulgiformes									
Caprimulgidae									
<i>Antrostomus rufus</i> (Boddaert, 1783)	Rufous Nightjar		XC387948		0.05			0.03	
<i>Lurocalis semitorquatus</i> (Gmelin, 1789)	Short-tailed Nighthawk		XC395165		0.03				
<i>Nyctidromus albicollis</i> (Gmelin, 1789)	Common Pauraque		XC387953		0.29		0.06	0.07	0.02
<i>Hydropsalis parvula</i> (Gould, 1837)	Little Nightjar		XC402783		0.08			0.07	
<i>Hydropsalis longirostris</i> (Bonaparte, 1825)	Band-winged Nightjar		XC392826				0.03		
<i>Hydropsalis torquata</i> (Gmelin, 1789)	Scissor-tailed Nightjar		XC387964		0.11	0.08	0.03	0.03	
Apodiformes									
Apodidae									
<i>Cypseloides senex</i> (Temminck, 1826)	Great Dusky Swift			WA2890263	0.05		0.03		
<i>Streptoprocne zonaris</i> (Shaw, 1796)	White-collared Swift			WA2723259	0.03				
Trochilidae									
<i>Glaucis hirsutus</i> (Gmelin, 1788)	Rufous-breasted Hermit					0.25			
<i>Phaethornis nattereri</i> Berlepsch, 1887	Cinnamon-throated Hermit								0.07
<i>Phaethornis ruber</i> (Linnaeus, 1758)	Reddish Hermit				0.03				0.02
<i>Phaethornis pretrei</i> (Lesson & Delattre, 1839)	Planalto Hermit		XC400263		0.05		0.03	0.07	0.07
<i>Eupetomena macroura</i> (Gmelin, 1788)	Swallow-tailed Hummingbird							0.03	
<i>Colibri serrirostris</i> (Vieillot, 1816)	White-vented Violetear		XC400255	WA2730248	0.03			0.10	
<i>Anthracothorax nigricollis</i> (Vieillot, 1817)	Black-throated Mango			WA2731331	0.16				

Taxon name	English name	Vouchers			Area				
		Specimen	Voice	Photo	A (FO) T	A (FO) M	B (FO)	C (FO)	D (FO)
<i>Trogon melanurus</i> Swainson, 1838	Black-tailed Trogon	4165	XC400238	WA2739658	0.61				0.07
<i>Trogon viridis</i> Linnaeus, 1766	Green-backed Trogon		XC400212	WA2404272	0.16				0.02
<i>Trogon curucui</i> Linnaeus, 1766	Blue-crowned Trogon			WA2720942	0.89	0.80	0.06	0.10	0.15
<i>Trogon collaris</i> Vieillot, 1817	Collared Trogon		XC400216	WA2760486	0.16				
Coraciiformes									
Alcedinidae									
<i>Megaceryle torquata</i> (Linnaeus, 1766)	Ringed Kingfisher		XC387973		0.03				
<i>Chloroceryle amazona</i> (Latham, 1790)	Amazon Kingfisher			WA2723263	0.08				
<i>Chloroceryle aenea</i> (Pallas, 1764)	American Pygmy Kingfisher								0.02
<i>Chloroceryle americana</i> (Gmelin, 1788)	Green Kingfisher			ML88502091	0.03	0.08			
<i>Chloroceryle inda</i> (Linnaeus, 1766)	Green-and-rufous Kingfisher			ML87937381	0.03	0.08			
Momotidae									
<i>Momotus momota</i> (Linnaeus, 1766)	Amazonian Motmot		XC400340	WA2733665	0.82	0.25	0.16	0.07	0.22
Galbuliformes									
Galbulidae									
<i>Galbula ruficauda</i> Cuvier, 1816	Rufous-tailed Jacamar			WA2470881	0.18				0.4
Bucconidae									
<i>Notharchus tectus</i> (Boddaert, 1783)	Pied Puffbird			WA2880809					
<i>Bucco tamatia</i> Gmelin, 1788	Spotted Puffbird			WA2737792	0.05				
<i>Nystalus striolatus</i> (Pelzeln, 1856)	Natterer’s Striolated Puffbird			WA2272011	0.03				
<i>Nystalus chacuru</i> (Vieillot, 1816)	White-eared Puffbird		XC400265				0.09	0.03	
<i>Nystalus maculatus</i> (Gmelin, 1788)	Spot-backed Puffbird		XC400318		0.37	0.25			
<i>Nonnula ruficapilla</i> (Tschudi, 1844)	Rufous-capped Nunlet		XC404457	WA2733668	0.03				0.02
<i>Monasa nigrifrons</i> (Spix, 1824)	Black-fronted Nunbird		XC404455	WA2720948	0.89	0.08	0.06		0.24
<i>Chelidoptera tenebrosa</i> (Pallas, 1782)	Swallow-winged Puffbird		XC401100						
Piciformes									
Ramphastidae									
<i>Ramphastos toco</i> Statius Müller, 1776	Toco Toucan		XC404588	WA2733684	0.29		0.09	0.07	0.02
<i>Ramphastos tucanus</i> Linnaeus, 1758	White-throated Toucan		XC402246						
<i>Pteroglossus inscriptus</i> Swainson, 1822	Lettered Aracari		XC400207	WA2739647	0.16		0.06		0.02
<i>Pteroglossus castanotis</i> Gould, 1834	Chestnut-eared Aracari		XC400328	WA2742653	0.61	0.08	0.09	0.03	0.09
Picidae									
<i>Picumnus albosquamatus</i> d’Orbigny, 1840	White-wedged Piculet				0.05				
<i>Melanerpes candidus</i> (Otto, 1796)	White Woodpecker			WA2850102	0.13			0.03	
<i>Melanerpes cruentatus</i> (Boddaert, 1783)	Yellow-tufted Woodpecker		XC401101				0.03		0.22
<i>Veniliornis affinis</i> (Swainson, 1821)	Red-stained Woodpecker		XC402243		0.05				0.07
<i>Veniliornis passerinus</i> (Linnaeus, 1766)	Little Woodpecker				0.08				0.4
<i>Piculus chrysochloros</i> (Vieillot, 1818)	Golden-green Woodpecker								0.02
<i>Colaptes melanochloros</i> (Gmelin, 1788)	Green-barred Woodpecker		XC400270					0.10	
<i>Colaptes campestris</i> (Vieillot, 1818)	Campo Flicker							0.17	
<i>Celeus torquatus</i> (Boddaert, 1783)	Ringed Woodpecker		XC400346		0.08				
<i>Celeus lugubris</i> (Malherbe, 1851)	Pale-crested Woodpecker			WA2470864	0.34	0.08	0.03	0.03	0.07
<i>Dryocopus lineatus</i> (Linnaeus, 1766)	Lineated Woodpecker			WA2730247	0.08			0.03	
<i>Campephilus rubricollis</i> (Boddaert, 1783)	Red-necked Woodpecker		XC404575	WA2737747	0.34				0.02
<i>Campephilus melanoleucos</i> (Gmelin, 1788)	Crimson-crested Woodpecker				0.16				0.07
Cariamiformes									
Cariamidae									
<i>Cariama cristata</i> (Linnaeus, 1766)	Red-legged Seriema		XC404581	WA2733680	0.03		0.09	0.13	
Falconiformes									
Falconidae									
<i>Caracara plancus</i> (Miller, 1777)	Southern Caracara								0.03
<i>Herpetotheres cachinnans</i> (Linnaeus, 1758)	Laughing Falcon			WA2737948	0.08		0.06	0.03	
<i>Micrastur ruficollis</i> (Vieillot, 1817)	Barred Forest-Falcon		XC387980		0.45		0.03		0.02
<i>Micrastur semitorquatus</i> (Vieillot, 1817)	Collared Forest-Falcon		XC400213		0.03				0.02
<i>Falco sparverius</i> Linnaeus, 1758	American Kestrel								0.02
<i>Falco rufigularis</i> Daudin, 1800	Bat Falcon			WA2720926					
Psittaciformes									
Psittacidae									
<i>Anodorhynchus hyacinthinus</i> (Latham, 1790) VU	Hyacinth Macaw								
<i>Ara ararauna</i> (Linnaeus, 1758)	Blue-and-yellow Macaw		XC400211		0.16				
<i>Ara chloropterus</i> Gray, 1859	Red-and-green Macaw			WA2737754	0.18			0.10	
<i>Orthopsittaca manilatus</i> (Boddaert, 1783)	Red-bellied Macaw				0.03				
<i>Primolius auricollis</i> (Cassin, 1853)	Yellow-collared Macaw				0.08				0.02
<i>Diopsittaca nobilis</i> (Linnaeus, 1758)	Red-shouldered Macaw		XC400321		0.92		0.16	0.27	0.09
<i>Psittacara leucophthalmus</i> (Statius Müller, 1776)	White-eyed Parakeet				0.03		0.06		0.02
<i>Aratinga weddellii</i> (Deville, 1851)	Dusky-headed Parakeet		XC400312						0.22
<i>Eupsittula aurea</i> (Gmelin, 1788)	Peach-fronted Parakeet		XC387976	WA2731325	0.08		0.28	0.30	0.07
<i>Brotogeris chiriri</i> (Vieillot, 1818)	Yellow-chevroned Parakeet		XC387977	WA2722019	0.18		0.25	0.20	0.09
<i>Pionus menstruus</i> (Linnaeus, 1766)	Blue-headed Parrot		XC404583	WA2858459	0.05				0.22

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		Specimen	Voice	Photo	A (FO) T	A (FO) M	B (FO)	C (FO)	D (FO)
<i>Amazona amazonica</i> (Linnaeus, 1766)	Orange-winged Parrot		XC404461		0.08				
<i>Amazona aestiva</i> (Linnaeus, 1758)	Turquoise-fronted Parrot								
Passeriformes									
Thamnophilidae									
<i>Myrmophylax atrothorax</i> (Boddaert, 1783)	Black-throated Antbird		XC400233	WA2739648	0.50	0.33	0.06		0.50
<i>Formicivora grisea</i> (Boddaert, 1783)	White-fringed Antwren	4185	XC401103	WA2858460	0.97	0.75			0.02
<i>Formicivora rufa</i> (Wied, 1831)	Rusty-backed Antwren		XC387972				0.19		
<i>Dysithamnus mentalis</i> (Temminck, 1823)	Plain Antvireo		XC400337		0.68	0.42	0.03		0.22
<i>Herpsilochmus longirostris</i> Pelzeln, 1868 CE	Large-billed Antwren		XC400264		0.05				
<i>Thamnophilus doliatus</i> (Linnaeus, 1764)	Barred Antshrike		XC400262					0.03	
<i>Thamnophilus schistaceus</i> d'Orbigny, 1835	Plain-winged Antshrike		XC402784						0.02
<i>Thamnophilus pelzelni</i> Hellmayr, 1924	Planalto Slaty-Antshrike	4183		WA2470876	0.97	0.75	0.28	0.13	0.02
<i>Thamnophilus aethiops</i> Sclater, 1858	White-shouldered Antshrike		XC402241		0.05				0.07
<i>Thamnophilus amazonicus</i> Sclater, 1858	Amazonian Antshrike	4159 / 4176	XC400342		0.13	0.08			
<i>Taraba major</i> (Vieillot, 1816)	Great Antshrike				0.03				
<i>Pyriglena leuconota</i> (Spix, 1824)	White-backed Fire-eye		XC404570		0.26				0.13
<i>Hypocnemis ochrogyna</i> Zimmer, 1932 VU*	Rondonia Warbling-Antbird		XC400232		0.05		0.06		0.46
<i>Willisornis poecilinotus</i> (Cabanis, 1847)	Common Scale-backed Antbird	4175			0.21	0.50			
Melanopareiidae									
<i>Melanopareia torquata</i> (Wied, 1831) CE	Collared Crescentchest		XC400320				0.06	0.10	
Dendrocolaptidae									
<i>Dendrocincla fuliginosa</i> (Vieillot, 1818)	Plain-brown Woodcreeper	4160	XC387951	WA2737748	0.66	0.83			0.02
<i>Sittasomus griseicapillus</i> (Vieillot, 1818)	Olivaceous Woodcreeper		XC401106	WA2720928	0.58	0.50			
<i>Xiphorhynchus guttatoides</i> (Lafresnaye, 1850)	Lafresnaye's Woodcreeper	4179		WA2720943	0.87	0.50	0.03		0.37
<i>Dendroplex picus</i> (Gmelin, 1788)	Straight-billed Woodcreeper								0.02
<i>Lepidocolaptes fuscicapillus</i> (Pelzeln, 1868)	Rondonia Woodcreeper								0.02
Xenopidae									
<i>Xenops rutilans</i> Temminck, 1821	Streaked Xenops		XC400332		0.08				0.02
Furnariidae									
<i>Furnarius rufus</i> (Gmelin, 1788)	Rufous Hornero			WA2733658				0.10	
<i>Synallaxis frontalis</i> Pelzeln, 1859	Sooty-fronted Spinetail		XC400256					0.07	
Pipridae Rafinesque, 1815									
<i>Neopelma pallescens</i> (Lafresnaye, 1853)	Pale-bellied Tyrant-Manakin	4167	XC400217	WA2737750	0.97	0.92	0.22	0.07	
<i>Pipra fasciicauda</i> Hellmayr, 1906	Band-tailed Manakin	4168 / 4171		WA2470867	0.97	1.00	0.09		0.30
<i>Manacus manacus</i> (Linnaeus, 1766)	White-bearded Manakin			WA2720932	0.24	0.67			
<i>Machaeropterus pyrocephalus</i> (Sclater, 1852)	Fiery-capped Manakin		XC400210		0.08	0.42			
<i>Chiroxiphia pareola</i> (Linnaeus, 1766)	Blue-backed Manakin	4181	XC402245		0.11	0.08			
<i>Antilophia galeata</i> (Lichtenstein, 1823) CE	Helmeted Manakin	4172	XC400260	WA2740293	0.08	0.17	0.09	0.20	
Oxyruncidae									
<i>Oxyruncus cristatus</i> Swainson, 1821	Sharpbill								0.4
Tityridae									
<i>Tityra cayana</i> (Linnaeus, 1766)	Black-tailed Tityra				0.05		0.03		0.4
<i>Tityra semifasciata</i> (Spix, 1825)	Masked Tityra				0.08		0.03		0.02
<i>Pachyramphus polychopterus</i> (Vieillot, 1818)	White-winged Becard					0.08	0.03		
Cotingidae									
<i>Gymnoderus foetidus</i> (Linnaeus, 1758)	Bare-necked Fruitcrow				0.03				
Platyrinchidae									
<i>Platyrinchus mystaceus</i> Vieillot, 1818	White-throated Spadebill		XC387974			0.08	0.06		
Rhynchocyclidae									
<i>Mionectes oleagineus</i> (Lichtenstein, 1823)	Ochre-bellied Flycatcher		XC387952		0.18	0.67	0.03		
<i>Leptopogon amaurocephalus</i> Tschudi, 1846	Sepia-capped Flycatcher	4169	XC404459	WA2858466	0.63	0.83			0.15
<i>Corythopis delalandi</i> (Lesson, 1830)	Southern Antpipit	4177	XC387945		0.95	0.75		0.03	
<i>Tolmomyias sulphurescens</i> (Spix, 1825)	Yellow-olive Flycatcher				0.21				
<i>Tolmomyias assimilis</i> (Pelzeln, 1868)	Yellow-margined Flycatcher		XC402239		0.16				0.07
<i>Tolmomyias flaviventris</i> (Wied, 1831)	Yellow-breasted Flycatcher	4184	XC400345		0.53	0.33	0.03		
<i>Myiornis ecaudatus</i> (d'Orbigny & Lafresnaye, 1837)	Short-tailed Pygmy-Tyrant		XC402237						0.02
<i>Hemitriccus minor</i> (Snethlage, 1907)	Snethlage's Tody-Tyrant		XC402235		0.08				0.26
<i>Hemitriccus flammulatus</i> Berlepsch, 1901	Flammulated Pygmy-Tyrant	4186		WA2850104	0.71	0.25			
<i>Hemitriccus striaticollis</i> (Lafresnaye, 1853)	Stripe-necked Tody-Tyrant		XC404453	WA2720944	0.89	0.33			
<i>Hemitriccus margaritaceiventer</i> (d'Orbigny & Lafresnaye, 1837)	Pearly-vented Tody-tyrant		XC400314				0.19	0.17	
Tyrannidae									
<i>Hirundinea ferruginea</i> (Gmelin, 1788)	Cliff Flycatcher			WA2730241				0.03	
<i>Ornithion inerme</i> Hartlaub, 1853	White-lored Tyrannulet		XC402234		0.08				
<i>Camptostoma obsoletum</i> (Temminck, 1824)	Southern Beardless-Tyrannulet		XC404563	WA2720935	0.66	0.08	0.09	0.17	0.02
<i>Elaenia flavogaster</i> (Thunberg, 1822)	Yellow-bellied Elaenia		XC392827		0.03		0.06	0.23	
<i>Elaenia chilensis</i> Hellmayr, 1927	Chilean Elaenia	4166 / 4170				0.08			

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<i>Elaenia parvirostris</i> Pelzelin, 1868	Small-billed Elaenia	4187				0.08	0.13	0.07	
<i>Elaenia cristata</i> Pelzelin, 1868	Plain-crested Elaenia				0.08		0.06	0.07	
<i>Elaenia chiriquensis</i> Lawrence, 1865	Lesser Elaenia	4182	XC392825		0.03	0.17	0.09	0.07	
<i>Myiopagis gaimardii</i> (d'Orbigny, 1839)	Forest Elaenia		XC404458		0.92	0.50	0.03		0.22
<i>Myiopagis caniceps</i> (Swainson, 1835)	Gray Elaenia		XC404681		0.03				
<i>Phaeomyias murina</i> (Spix, 1825)	Mouse-colored Tyrannulet		XC400327		0.29		0.09	0.10	
<i>Attila bolivianus</i> Lafresnaye, 1848	Dull-capped Attila		XC400235	WA2858509	0.53	0.33		0.03	
<i>Legatus leucophaeus</i> (Vieillot, 1818)	Piratic Flycatcher		XC401102		0.18	0.08			0.02
<i>Myiarchus tuberculifer</i> (d'Orbigny & Lafresnaye, 1837)	Dusky-capped Flycatcher		XC400219	WA2732376	0.63	0.08			0.17
<i>Myiarchus swainsoni</i> Cabanis & Heine, 1859	Swainson's Flycatcher	4178			0.24	0.25	0.03		
<i>Myiarchus ferox</i> (Gmelin, 1789)	Short-crested Flycatcher		XC404569		0.26		0.03		
<i>Myiarchus tyrannulus</i> (Statius Müller, 1776)	Brown-crested Flycatcher		XC404568		0.42	0.25	0.09	0.10	
<i>Sirystes sibilator</i> (Vieillot, 1818)	Sibilant Sirystes		XC400206		0.61	0.08	0.03		0.13
<i>Rhytipterna simplex</i> (Lichtenstein, 1823)	Grayish Mourner		XC400237		0.26				
<i>Casiornis rufus</i> (Vieillot, 1816)	Rufous Casiornis		XC404454	WA2720927	0.76	0.50	0.19	0.13	0.4
<i>Pitangus sulphuratus</i> (Linnaeus, 1766)	Great Kiskadee			WA2722018					0.17
<i>Myiodynastes maculatus</i> (Statius Müller, 1776)	Streaked Flycatcher			WA2730242	0.24	0.08	0.03	0.10	0.02
<i>Megarynchus pitangua</i> (Linnaeus, 1766)	Boat-billed Flycatcher		XC400313		0.21		0.09	0.10	0.09
<i>Myiozetetes cayanensis</i> (Linnaeus, 1766)	Rusty-margined Flycatcher		XC387956	WA2722295	0.63	0.08	0.03	0.10	0.4
<i>Tyrannus melancholicus</i> Vieillot, 1819	Tropical Kingbird			WA2737751	0.08	0.08	0.06	0.13	
<i>Tyrannus savana</i> Daudin, 1802	Fork-tailed Flycatcher			WA2722020			0.03	0.10	
<i>Griseotyrannus aurantioatrocristatus</i> (d'Orbigny & Lafresnaye, 1837)	Crowned Slaty Flycatcher			WA2730238				0.03	
<i>Empidonomus varius</i> (Vieillot, 1818)	Variegated Flycatcher		XC401104		0.32	0.25	0.03	0.07	
<i>Myiophobus fasciatus</i> (Statius Müller, 1776)	Bran-colored Flycatcher			WA2742649			0.03	0.03	
<i>Pyrocephalus rubinus</i> (Boddaert, 1783)	Vermilion Flycatcher			WA2722017				0.03	
<i>Cnemotriccus fuscatus</i> (Wied, 1831)	Fuscouc Flycatcher		XC400343	WA2720929	0.74	0.83	0.03	0.07	
<i>Lathrotriccus euleri</i> (Cabanis, 1868)	Euler's Flycatcher		XC404452	WA2732380	0.61	0.42			
<i>Xolmis cinereus</i> (Vieillot, 1816)	Gray Monjita			WA2733679					0.07
Vireonidae									
<i>Cyclarhis gujanensis</i> (Gmelin, 1789)	Rufous-browed Peppershrike			WA2731326	0.95	0.17	0.28	0.30	0.13
<i>Vireo olivaceus</i> (Linnaeus, 1766)	Red-eyed Vireo	4158			0.05	0.17			
<i>Vireo chivi</i> (Vieillot, 1817)	Chivi Vireo		XC387946	WA2722314	0.58	0.50	0.06	0.03	
Corvidae									
<i>Cyanocorax cyanomelas</i> (Vieillot, 1818)	Purplish Jay		XC400317		0.03		0.19		0.02
<i>Cyanocorax cristatellus</i> (Temminck, 1823) CE	Curl-crested Jay		XC400261	WA2730240	0.05			0.23	
Hirundinidae									
<i>Stelgidopteryx ruficollis</i> (Vieillot, 1817)	Southern Rough-winged Swallow			WA2722297	0.21			0.03	0.09
<i>Progne tapera</i> (Vieillot, 1817)	Brown-chested Martin			WA2741410				0.10	
<i>Progne chalybea</i> (Gmelin, 1789)	Gray-breasted Martin			WA2739645				0.07	
Troglodytidae									
<i>Troglodytes musculus</i> Naumann, 1823	Southern House Wren		XC400319	WA2741418			0.03	0.10	
<i>Campylorhynchus turdinus</i> (Wied, 1831)	Thrush-like Wren				0.03				
<i>Pheugopedius genibarbis</i> (Swainson, 1838)	Moustached Wren		XC402824		0.03				0.11
Poliophtilidae									
<i>Poliophtila dumicola</i> (Vieillot, 1817)	Masked Gnatcatcher								
Turdidae									
<i>Catharus fuscescens</i> (Stephens, 1817)	Veery	4161				0.08			
<i>Turdus leucomelas</i> Vieillot, 1818	Pale-breasted Thrush		XC387949	WA3050241	0.95	0.50	0.13	0.17	0.4
<i>Turdus hauxwelli</i> Lawrence, 1869	Hauxwell's Thrush	4157 / 4163	XC402233	WA2850093	0.39	0.67			0.13
<i>Turdus rufiventris</i> Vieillot, 1818	Rufous-bellied Thrush		XC400267	WA2741419			0.03	0.07	0.02
<i>Turdus amaurochalinus</i> Cabanis, 1850	Creamy-bellied Thrush	4180		WA2866278	0.08	0.25	0.09	0.07	0.02
Mimidae									
<i>Mimus saturninus</i> (Lichtenstein, 1823)	Chalk-browed Mockingbird		XC387969	WA2731343			0.13	0.20	
Passerellidae									
<i>Zonotrichia capensis</i> (Statius Müller, 1776)	Rufous-collared Sparrow		XC400258	WA2733669				0.13	
<i>Ammodramus humeralis</i> (Bosc, 1792)	Grassland Sparrow			WA2730239				0.07	
<i>Arremon taciturnus</i> (Hermann, 1783)	Pectoral Sparrow	4162 / 4174	XC400230		0.66	0.67			0.11
<i>Arremon flavirostris</i> Swainson, 1838	Saffron-billed Sparrow		XC404275					0.07	
Parulidae									
<i>Geothlypis aequinoctialis</i> (Gmelin, 1789)	Masked Yellowthroat							0.03	
<i>Basileuterus culicivorus</i> (Deppe, 1830)	Golden-crowned Warbler		XC387944	WA2723262	1.00	0.83	0.13	0.10	0.37
<i>Myiothlypis flaveola</i> Baird, 1865	Flavescent Warbler		XC401105	WA2866279	0.97	0.75	0.28	0.10	0.13
Icteridae									
<i>Cacicus cela</i> (Linnaeus, 1758)	Yellow-rumped Cacique			WA2858465	0.16		0.06	0.03	0.11
<i>Icterus pyrrhopterus</i> (Vieillot, 1819)	Variable Oriole		XC387981	WA2733656	0.11		0.03		0.07
<i>Icterus croconotus</i> (Wagler, 1829)	Orange-backed Troupial		XC400316	WA2866291					0.4

Taxon name	English name	Vouchers			Area				
		Specimen	Voice	Photo	A (FO) T	A (FO) M	B (FO)	C (FO)	D (FO)
<i>Gnorimopsar chopi</i> (Vieillot, 1819)	Chopi Blackbird			WA2730245				0.17	
<i>Molothrus bonariensis</i> (Gmelin, 1789)	Shiny Cowbird			WA2732455				0.07	
Thraupidae									
<i>Neothraupis fasciata</i> (Lichtenstein, 1823) CE NT	White-banded Tanager		XC387979				0.06	0.10	
<i>Cissopis leverianus</i> (Gmelin, 1788)	Magpie Tanager		XC400336	WA2737753	0.05				0.07
<i>Schistochlamys melanopis</i> (Latham, 1790)	Black-faced Tanager		XC400180	WA2739641	0.37	0.08	0.19	0.27	
<i>Tangara mexicana</i> (Linnaeus, 1766)	Turquoise Tanager			WA2858467	0.05				
<i>Tangara sayaca</i> (Linnaeus, 1766)	Sayaca Tanager		XC400257	WA2866107	0.18		0.22	0.37	
<i>Tangara palmarum</i> (Wied, 1821)	Palm Tanager			WA2741415	0.37	0.08	0.03	0.03	
<i>Tangara cayana</i> (Linnaeus, 1766)	Burnished-buff Tanager			WA2858468			0.06	0.10	
<i>Sicalis citrina</i> Pelzeln, 1870	Stripe-tailed Yellow-Finch		XC400311					0.10	
<i>Hemithraupis guira</i> (Linnaeus, 1766)	Guira Tanager		XC387978	WA2731327			0.09		
<i>Volatinia jacarina</i> (Linnaeus, 1766)	Blue-black Grassquit			WA2732453				0.03	
<i>Eucometis penicillata</i> (Spix, 1825)	Gray-headed Tanager		XC400222		0.16	0.42			0.22
<i>Coryphospingus cucullatus</i> (Statius Müller, 1776)	Red-crested Finch			WA2730246		0.08	0.06	0.07	
<i>Lanio luctuosus</i> (d'Orbigny & Lafresnaye, 1837)	White-shouldered Tanager			WA2858508	0.21	0.08			0.07
<i>Lanio cristatus</i> (Linnaeus, 1766)	Flame-crested Tanager		XC404462		0.03				
<i>Tachyphonus rufus</i> (Boddaert, 1783)	White-lined Tanager		XC404456	WA2877693	0.55	0.42	0.06	0.13	0.07
<i>Ramphocelus carbo</i> (Pallas, 1764)	Silver-beaked Tanager			WA2858501	0.82	0.08		0.10	
<i>Tersina viridis</i> (Illiger, 1811)	Swallow Tanager		XC400344	WA2733661	0.29		0.03	0.07	
<i>Cyanerpes cyaneus</i> (Linnaeus, 1766)	Red-legged Honeycreeper			WA2742652	0.61	0.42	0.09	0.07	0.02
<i>Dacnis cayana</i> (Linnaeus, 1766)	Blue Dacnis		XC400326	WA2470866	0.58	0.17	0.13	0.10	0.4
<i>Sporophila plumbea</i> (Wied, 1830)	Plumbeous Seedeater			WA2730249				0.07	
<i>Sporophila</i> cf. <i>nigricollis</i> (Vieillot, 1823)	Yellow-bellied Seedeater	4164				0.08			
<i>Sporophila caerulescens</i> (Vieillot, 1823)	Double-collared Seedeater			WA2272170					
<i>Sporophila leucoptera</i> (Vieillot, 1817)	White-bellied Seedeater							0.03	
<i>Saltatricula atricollis</i> (Vieillot, 1817) CE	Black-throated Saltator		XC387971	WA2742646			0.25	0.17	
<i>Saltator maximus</i> (Statius Müller, 1776)	Buff-throated Saltator		XC400228	WA2866114	0.84	0.50	0.06		0.13
<i>Saltator coerulescens</i> Vieillot, 1817	Grayish Saltator						0.03		
<i>Saltator similis</i> d'Orbigny & Lafresnaye, 1837	Green-winged Saltator		XC387961				0.03		
<i>Cypsnagra hirundinacea</i> (Lesson, 1831) CE	White-rumped Tanager		XC387970	WA2739644			0.06	0.03	
Cardinalidae									
<i>Piranga flava</i> (Vieillot, 1822)	Hepatic Tanager		XC387975	WA2731328			0.06		
Fringillidae									
<i>Euphonia chlorotica</i> (Linnaeus, 1766)	Purple-throated Euphonia		XC404573	WA2760484	0.95	0.08	0.34	0.17	0.15
<i>Euphonia lanirostris</i> d'Orbigny & Lafresnaye, 1837	Thick-billed Euphonia			WA2732379	0.47	0.25			0.4

New records for Estação Ecológica da Serra das Araras

Agamia agami (Gmelin, 1789) Figure 3A

We recorded a single individual in September 2016, foraging along the Camarinha River, near the EESA headquarters, in Area A. It was readily identified by its multicolored plumage, according to Sick (1997).

Cathartes melambrotus Wetmore, 1964

We recorded this species soaring on thermal currents over a semideciduous seasonal forest. Identified by black primaries contrasting with grayish secondaries and by the typical silhouette.

Harpagus bidentatus (Latham, 1790) Figure 3B

We recorded the species twice, the first time randomly in January 2017, as the bird soared on a thermal above the EESA headquarters, and the second in February 2017, when an individual was perched on a tree canopy. Both times the species was identified by the grayish top and sides of head, rufous breast, belly and thighs barred with white and bipartite stripe on throat (Sick 1997).

Harpagus diodon (Temminck, 1823)

We recorded this species in September 2016, ascending on a thermal, in Area A. Identified by its rufous thighs

and upper wing coverts and light gray breast, which differentiates it from *H. bidentatus*.

Accipiter superciliosus (Linnaeus, 1766) Figure 3C

Our first contact with this species was random, on the border of a seasonal forest near EESA headquarters in October 2016. During the transects we had 2 more contacts, in February and August 2017. The species was identified in the field by its relatively short tail, slate gray upper parts, and white underparts and thighs thickly barred with narrow buffish stripes (Sick 1997).

Coccyzus euleri Cabanis, 1873 Figure 3D

We recorded the species in December 2016, on the border of a semideciduous seasonal forest, while it moved on the upper middle level of the canopy. Identified in the field by the uniform earth-brown upperparts, light pearly-gray below, whitish belly and long tail. No rufous primaries, which are evident in its congener *Coccyzus americanus* (Payne 2018).

Lurocalis semitorquatus (Gmelin, 1789)

We recorded the species by voice, in March 2017, on the border of a semideciduous seasonal forest.

***Cypseloides senex* (Temminck, 1826)**

We recorded the species systematically in February and March 2017 (Area A) and in August 2017 (Area B). During the rest of the study, we made additional random contacts with this species. On many occasions, groups of individuals (> 40) were recorded in flight. Identified in the field by its whitish head contrasting with the rest of the body, a characteristic not seen in its congener *Cypseloides fumigatus* (Streubel, 1848), according to Sick (1997).

***Lophornis gouldii* (Lesson, 1832) Figure 3E**

We recorded this species systematically in July 2017 in Area A, at an altitude of 230 m, on the border of a riparian forest. Readily identified by its white lateral tufts with shining green extremities, according to Züchner and Boesman (2018a) and longer than the ones found in *Lophornis magnificus* (Vieillot, 1817) (Züchner and Boesman 2018b).

***Hylocharis cyanus* (Vieillot, 1818)**

We recorded this species by voice several times in a semideciduous seasonal forest during the transects (FO = 0.74), and also captured an individual, identified by its violet-blue head, neck and chest, white chin and black-tipped red bill (Sick 1997).

***Ramphastos tucanus* Linnaeus 1758**

We recorded the subspecies *Ramphastos t. cuvieri* Wagler (1827) in October 2016 randomly, by voice. The bird was in a riparian forest in Area A.

***Veniliornis affinis* (Swainson, 1821)**

We recorded this species twice, in January and August 2017, in the riparian forest in Area A. Two additional contacts took place in deciduous seasonal forests, in Area D. In one case, the contact was documented by audio recording.

***Celeus torquatus* (Boddaert, 1783) Figure 3F**

We recorded the subspecies *Celeus torquatus occidentalis* (Hargitt, 1889) randomly in August 2016, in Area A. Other contacts were made systematically during the transects, in July and September 2017. The species was identified in the field by its caramel-colored head, black foreneck and chest, chestnut mantle with black barring and whitish belly with coarse black markings (Sick 1997). The male has a broad red band on the malar region (Winkler et al. 2018). In some cases, the species was identified solely by voice.

***Primolius auricollis* (Cassin, 1853)**

We recorded a flock flying overhead in December 2016, without being able to obtain a voucher specimen. The species was readily identified by the yellow collar on the lower hindneck and pale-yellow naked face (Sick 1997).

***Thamnophilus schistaceus* d'Orbigny, 1835**

We recorded this species systematically in Area D, on a patch of semideciduous seasonal forest in August 2017. Identified by voice while vocalizing in mid-level vegetation.

***Thamnophilus aethiops* Sclater, 1858 Figure 3G**

We recorded this species in Area A, in January and August 2017 in semideciduous seasonal forest. We also recorded 2 individuals in Area D, in August. At all times the species was first identified by voice.

***Thamnophilus amazonicus* Sclater, 1858 Figure 3H**

We first recorded this species by voice in riparian forest in February 2017. We later recorded it in March, June and July of the same year. We collected 2 specimens with mist nets and deposited them at UFMT under catalog numbers 4159 and 4176.

***Chiroxiphia pareola* (Linnaeus, 1766) Figure 4A**

We first recorded this species by several sound contacts in December 2016 and January, February and March 2017 in semideciduous seasonal forest. We also captured a female and deposited it at UFMT under catalog number 4181. According to the geographical distribution given by BirdLife International and the Handbook of the Birds of the World (2016), records for *C. pareola* at EESA extend the species' known geographical range.

***Gymnoderus foetidus* (Linnaeus, 1758)**

We recorded the species systematically in September 2017, while 1 individual flew over a riparian forest. The species was identified by its black plumage, throat wattles and blue bare skin on the sides of the neck (Sick 1997).

***Tolmomyias assimilis* (Pelzeln, 1868)**

We recorded this species in semideciduous seasonal forest in Area A in February, March, April and May 2017. We also recorded it in Area D, the northern part of the EESA. At all times, it was identified by voice. According to the geographical distribution given by BirdLife International and the Handbook of the Birds of the World (2016), records for *T. assimilis* at EESA extend the species' known geographical range.

***Tolmomyias flaviventris* (Wied, 1831) Figure 4B**

We recorded the species on several occasions. A relatively common bird at EESA, with over 50% frequency of occurrence in Area A. A specimen was collected and deposited at UFMT under catalog number 4184.

***Myiornis ecaudatus* (d'Orbigny & Lafresnaye, 1837)**

We recorded this species in area D by voice while the individual vocalized in a tree canopy.

***Hemitriccus minor* (Snethlage, 1907)**

We first recorded this species in May 2016 in Area A, in semideciduous seasonal forest. We had several other contacts with the species in August in Area D, where it is more frequent. Identified most times by voice. According to the geographical distribution given by BirdLife International and the Handbook of the Birds of the World (2016), records for *H. minor* at EESA extend the species' known geographical range.

***Ornithion inerme* Hartlaub, 1853**

We recorded the species once in March and twice in August 2017 in semideciduous seasonal forest and border



Figure 3. **A.** *Agamia agami*. **B.** *Harpagus bidentatus*. **C.** *Accipiter superciliosus*. **D.** *Coccyzus euleri*. **E.** *Lophornis gouldii*. **F.** *Celeus torquatus*. **G.** *Thamnophilus aethiops*. **H.** *Thamnophilus amazonicus*. (Photos: BDV except for *Celeus torquatus*, photographed by AVBF).

areas. Identified by voice at all times. According to the geographical distribution given by BirdLife International and the Handbook of the Birds of the World (2016), records for *O. inermis* at EESA extend the species' known geographical range.

***Rhytipterna simplex* (Lichtenstein, 1823)**

We recorded the species in April, May, June, July, August and September 2017. It was present in 26% of the repetitions in transect A. We readily identified it by voice at all times. In the EESA it is more often heard than seen.

***Vireo olivaceus* (Linnaeus, 1766) Figure 5A**

We captured 3 specimens with mist nets, 1 in November 2016 and 2 in January 2017. Identified by the elongated wings and the red iris. One individual was collected and deposited at UFMT under catalog number 4158. This is a Nearctic migrant that winters at EESA.

***Turdus hauxwelli* Lawrence, 1869 Figure 4C**

We recorded this species 18 times in the Area A transects, with additional contacts in Area C. Identification was always made by this species' typical call, the surest means of field identification, given the great similarity between *T. hauxwelli* and *T. fumigatus*. Some specimens were captured with mist nets. Two specimens were collected and deposited under catalog numbers 4157 and 4163 at UFMT, where the skins were identified through comparison.

***Lanio cristatus* (Linnaeus, 1766)**

We recorded a male of this species in semideciduous seasonal forest, but could not obtain a voucher specimen. Nevertheless, the individual was readily identified for its black plumage with yellowish buff throat and scarlet crown, as described in Sick (1997).

Near Threatened species (IUCN 2017)

***Rhea americana* (Linnaeus, 1758)**

We recorded the species in an open area under influence of a rural zone, in Area C. Readily identified by its gray mantle forming a dorsal humpback and enveloping the whole body, except for the rear, which is white and lacks a tail (Sick 1997).

***Odontophorus gujanensis* (Gmelin, 1789) Figure 5B**

We recorded the species in riparian forest and semideciduous seasonal forest, mostly near water bodies. Most times identified by voice. The species has reddish brown belly and bare orange eyering, which distinguishes it from its congener *O. capoeira* (Sick 1997).

***Spizaetus ornatus* (Daudin, 1800) Figure 5C**

We recorded the species in Area A, associated with forest or natural border areas. We also made 1 record in Area B. The species was identified mostly by voice. Sometimes the identification was visual, by its short, rounded wings and exceptionally long tail, legs and claws. Heavily plumed legs and a crest frequently erect at the top of the head (Sick 1997).

***Neothraupis fasciata* (Lichtenstein, 1823) Figure 5D**

We recorded the species in *cerrado* areas, generally at altitudes above 500 m, many times in mixed flocks with *Saltatricula atricollis* (Vieillot, 1817). Identified by gray upper parts, black mask, and black wing-coverts with white band; white throat and belly, gray breast (Sick 1997).

Threatened species

***Tinamus tao* Temminck, 1815 Figure 5E**

All records of this species were associated with riparian and seasonal forests. Identified by the bluish slate-gray back and light lead-gray belly (Sick 1997). The species is currently classified as Vulnerable at the national (Brazil 2016b) and global (IUCN 2017) levels.

***Crax fasciolata* Spix, 1825**

We recorded the species mostly in forest environments. The male has black plumage with white belly. The tip of the tail is white, distinguishing it from its congeners (Sick 1997). Currently classified as Vulnerable at the global level (IUCN 2017).

***Agamia agami* (Gmelin, 1789)**

Described above. Classified as Vulnerable at the global level (IUCN 2017).

***Lophornis gouldii* (Lesson, 1832)**

Described above. Classified as Vulnerable at the national (Brazil 2016b) and global (IUCN 2017) levels.

***Anodorhynchus hyacinthinus* (Latham, 1790)**

We recorded the species once, flying overhead. Identified by the dark blue plumage and yellow eyering, eyelid and strip at base of mandible (Sick 1997). Classified as Vulnerable at the global level (IUCN 2017).

***Hypocnemis ochrogyna* Zimmer, 1932 Figure 5F**

We recorded this species in Areas A and D, always in forest environments. In the EESA area, it replaces geographically its congeners of the *Hypocnemis cantator* complex. Identified most times by its song. Classified as Vulnerable at the national level (Brazil 2016b).

Cerrado endemics

***Herpsilochmus longirostris* Pelzeln, 1868**

We recorded this species at the border of a gallery forest, by voice.

***Melanopareia torquata* (Wied, 1831) Figure 5G**

We recorded the species in *cerrado* areas, generally at altitudes above 500 m. Identified by the black collar on the throat, white eyebrow and black sides of the head (Sick 1997).

***Antilophia galeata* (Lichtenstein, 1823)**

We recorded the species in riparian forest areas, mostly by voice. One female was collected and deposited at UFMT under catalog number 4172.

***Cyanocorax cristatellus* (Temminck, 1823)**



Figura 4. A. *Chiroxiphia pareola*. **B.** *Tolmomyias flaviventris*. **C.** *Turdus hauxwelli*. **D.** *Elaenia chilensis*. (Photos: Vitor Q. Piacentini).

We recorded the species in *cerrado* areas, generally at altitudes above 500 m. Identified by its long wings and relatively short tail with dark violet-blue mantle and white belly and distal two-thirds of tail. Unmistakable due to long frontal crest, separated from the crown (Sick 1997), in addition to its distinctive call.

***Neothraupis fasciata* (Lichtenstein, 1823)**

Described above.

***Cypsnagra hirundinacea* (Lesson, 1831)**

We recorded the species in *cerrado* areas, generally at altitudes above 500 m. Identified by black upper parts, with 2 white bands on wings and white rump. Whitish underparts, rufous throat (Sick 1997) and distinctive song.

Other noteworthy records

***Nystalus striolatus* (Pelzeln, 1856)**

We recorded this species associated with forest environments and occasionally to transition zones. Identified by the yellowish breast with black stripes. Similar to congeners *Nystalus obamai* Whitney, Piacentini, Schunck, Aleixo, Sousa, Silveira & Rego, 2013 and *Nystalus torridus* Bond & Meyer de Schauensee, 1940, but geographically separated.

***Oxyruncus cristatus* Swainson, 1821 Figure 6**

We recorded this species 3 times: once in a transition area from semideciduous seasonal forest to *cerrado*

stricto sensu in Area A, and 2 in a seasonal forest dominated by *Attalea speciosa* in Area D. The individuals were readily identified by their olive green color, red iris and yellowish underparts with black spots (Brooke 2018). The photo we present in this article is the first photographic record for the species in Mato Grosso, as we ascertained after an exhaustive search in the literature, ornithological collections and virtual databanks.

***Elaenia chilensis* Hellmayr, 1927 Figure 4E**

We captured 2 individuals, on 19 and 21 October 2016, respectively. They were collected and deposited at UFMT under catalog numbers 4170 and 4166, and identified through comparison with other specimens from the collection. *Elaenia chilensis* is an Austral migrant, with scarce documented records for the state of Mato Grosso. The information presented herein may contribute to understand the species' distribution and migration patterns and fill some of the existing knowledge gaps.

***Catharus fuscescens* (Stephens, 1817) Figure 5H**

We recorded this species in riparian and semideciduous seasonal forests, where it tends to be very discreet. Identified by rufous brown upperparts, white throat and belly, and yellowish breast. Sides of neck covered with brownish spotting (Sick 1997). One specimen was captured with mist net and deposited at UFMT under catalog number 4161. In Brazil, it is a seasonal visitor from the northern hemisphere (Piacentini et al. 2015).



Figura 5. **A.** *Vireo olivaceus*. **B.** *Odontophorus gujanensis*. **C.** *Spizaetus ornatus*. **D.** *Neothraupis fasciata*. **E.** *Tinamus tao*. **F.** *Hypocnemis ochrogyna*. **G.** *Melanopareia torquata*. **H.** *Catharus fuscescens*. (Photos: BDV).

Birds of Estação Ecológica da Serra das Araras: review

With the review of the bird occurrence records for EESA, we compiled a total of 458 species for the consolidated list, distributed over 27 orders and 69 families. Of these, 255 were assigned to the primary list and 203 to the secondary list (Table 3). On the tertiary list we included 7 species and 1 taxon identified only at the genus level (Table 4).

The following records placed on the secondary list deserve special attention due to their questionable nature:

Columbina cyanopis (Pelzeln, 1870)

Listed by Silva and Oniki (1988) and Valadão (2012). An extremely rare species. Occurrence records of *C. cyanopis* at EESA are based on 3 non-documented contacts. The first 2, presented by Silva and Oniki (1988), took place on 19 and 24 January 1986. The bird was identified by the distinct chestnut head and the blue markings on the wings. The third record (Valadão 2012) took place in *campo rupestre*, in March 2007. However, the species is mentioned in this context due to the absence of documented evidence for these 3 records and the many unsuccessful campaigns recently carried out in the region to document the species (Save Brazil 2010, Save Brazil 2011, Valadão 2012 and this article).

Cypseloides fumigatus (Streubel, 1848)

Listed by Silva and Oniki (1988) and Valadão (2012). A taxon difficult to identify, scarce in the region and which may be confused with *Cypseloides senex*. *Cypseloides senex* was recorded by us several times and does not feature in the lists by Willis and Oniki (1990) and Valadão (2012). We stress that at times we have come across individuals of genus *Cypseloides* without being able to identify them at the species level, so it is possible that both species occur at EESA.

Isleria hauxwelli (Sclater, 1857)

Listed by Silva and Oniki (1988) and Valadão (2012). This is a species typical of *terra firme* forest, and uncommon in the EESA region.

Thamnophilus caerulescens Vieillot, 1816

Listed by Silva and Oniki (1988). Uncommon in the region.

Rhegmatorhina hoffmannsi (Hellmayr, 1907)

Listed by Silva and Oniki (1988) and Valadão (2012). A species associated to *terra firme* forest, and uncommon in the EESA region.

Pachysylvia muscicapina (Sclater & Salvin, 1873)

Listed by Silva and Oniki (1988). A species associated to *terra firme* forest and *várzea*, and uncommon in the EESA region.

Turdus fumigatus Lichtenstein, 1823

Listed by Willis and Oniki (1990) and Valadão (2012). Scarce in the region and similar to its congener *T. hauxwelli*. During our expeditions, we recorded *T. hauxwelli*

several times and collected 2 skins. Since *T. hauxwelli* is not listed by Willis and Oniki (1990) or Valadão (2012), the documentation of *T. fumigatus* for EESA, especially for specimens collected, becomes essential.

Obtaining documented evidence for the species described above should be a priority in future studies at EESA. We also stress the importance of documenting other hitherto undocumented taxa whose presence in the EESA and in the southwest portion of the state of Mato Grosso is relevant due to their distribution pattern, irradiation and conservation: *Electron platyrhynchum* (Leadbeater, 1829), *Microrhopias quixensis* (Cornalia, 1849), *Conopophaga lineata* (Wied, 1831), *Hylexetastes uniformis* Hellmayr, 1909, *Clibanornis rectirostris* (Wied, 1831), *Syndactyla dimidiata* (Pelzeln, 1859), *Synallaxis gujanensis* (Gmelin, 1789), *Euscarthmus rufomarginatus* (Pelzeln, 1868), *Culicivora caudacuta* (Vieillot, 1818) and *Sporophila maximiliani* (Cabanis, 1851).

Discussion

In evaluating the richness of birds reported to EESA, it is observed a higher number of species recorded in relation to several areas of the Cerrado (see Valadão 2012), as well as several other protected areas in Brazil (Motta-Junior et al. 2008, Cavarzere et al. 2009, Aleixo and Guilherme 2010), with methodological reservations. Its expressive number of species places EESA among the richest protected areas in terms of bird species in Brazil (Pacheco et al. 2007, Pinheiro and Dornas 2009, Somenzari et al. 2011), especially in terms of areas not primarily covered by forest. This richness becomes even more significant when we consider the reduced size of the EESA, less than 30,000 ha.

This high bird species richness observed in EESA is associated with habitat diversity (Valadão 2012) as well as the integrity of the area. These habitats compose a mosaic comprising *campo*, savanna and forest areas inserted in an ecotone between Cerrado, the Amazon and the Pantanal wetland. Other studies done in ecotone areas have also evidenced high bird richness (Silveira and D'Horta 2002, Pinheiro and Dornas 2009, Somenzari et al. 2011, Lopes et al. 2016).

EESA's location, in the Upper Paraguay River, between the Plate River and the Amazon River basins, in addition to the multiple contacts between the riparian forest and other vegetation formations, favors an intense mix of avifaunal elements (Silva and Oniki 1988). Although located in the Cerrado, EESA displays a strong Amazonian influence on the bird composition in forest areas, be them riparian, lower montane, seasonal semideciduous or seasonal deciduous.

Some Amazonian species, like *Myrmophylax atrothorax*, and *Tangara mexicana* (Linnaeus, 1766), have been recorded in EESA since the first studies done in the area. Others, like *Thamnophilus amazonicus* and *Chiroxiphia pareola*, first recorded in our survey, suggest some recent

Table 3. Consolidated list of birds recorded at Estação Ecológica da Serra das Araras, state of Mato Grosso, Brazil. Sources: 1 Silva and Oniki (1988); 2 Willis and Oniki (1990); 3 Oniki and Oliveira (2002); 4 Valadão (2012); 5 this study; mp = mentioned exclusively in the management plan (Brazil 2016a); IO = Indication of Occurrence (species not documented); AD = A-level documentation (species with specimens deposited in scientific collections); BD = B-level documentation (species documented with photographs or audio recordings); VU* = Vulnerable (Brazil 2016b); EN* = Endangered (Brazil 2016b); CR* = Critically Endangered (Brazil 2016b); NT = Near Threatened (IUCN 2017); VU = Vulnerable (IUCN 2017); EN = Endangered (IUCN 2017); CE = Cerrado endemic. Secondary list species in brackets. Voucher numbers given in text, Table 2 and Appendix Table A1.

Taxon	English name	Source	Record type
Rheiformes			
Rheidae			
<i>Rhea americana</i> (Linnaeus, 1758) NT	Greater Rhea	4, 5	BD
Tinamiformes			
Tinamidae			
<i>Tinamus tao</i> Temminck, 1815 VU, VU*	Gray Tinamou	1, 2, 4, 5	BD
<i>Crypturellus soui</i> (Hermann, 1783)	Little Tinamou	1, 2, 4, 5	BD
<i>Crypturellus undulatus</i> (Temminck, 1815)	Undulated Tinamou	1, 2, 4, 5	BD
<i>Crypturellus parvirostris</i> (Wagler, 1827)	Small-billed Tinamou	1, 2, 3, 4, 5	BD
<i>Crypturellus tataupa</i> (Temminck, 1815)	Tataupa Tinamou	1, 2, 4, 5	BD
<i>Rhynchotus rufescens</i> (Temminck, 1815)	Red-winged Tinamou	2, 4, 5	BD
Anseriformes			
Anhimidae			
[<i>Chauna torquata</i> (Oken, 1816)]	Southern Screamer	4	IO
Anatidae			
[<i>Dendrocygna viduata</i> (Linnaeus, 1766)]	White-faced Whistling-Duck	4	IO
[<i>Dendrocygna autumnalis</i> (Linnaeus, 1758)]	Black-bellied Whistling-Duck	4	IO
[<i>Cairina moschata</i> (Linnaeus, 1758)]	Muscovy Duck	4	IO
[<i>Amazonetta brasiliensis</i> (Gmelin, 1789)]	Brazilian Teal	4	IO
Galliformes			
Cracidae			
<i>Penelope superciliaris</i> Temminck, 1815	Rusty-margined Guan	1, 2, 4, 5	BD
[<i>Penelope ochrogaster</i> Pelzeln, 1870] CE, VU, VU*	Chestnut-bellied Guan	4	IO
<i>Aburria kujubi</i> (Pelzeln, 1858)	Red-throated Piping-Guan	4, 5	BD
[<i>Ortalis canicollis</i> (Wagler, 1830)]	Chaco Chachalaca	4, 5	IO
<i>Crax fasciolata</i> Spix, 1825 VU	Bare-faced Curassow	4, 5	BD
Odontophoridae			
<i>Odontophorus gujanensis</i> (Gmelin, 1789) NT	Marbled Wood-Quail	1, 2, 4, 5	BD
Podicipediformes			
Podicipedidae			
<i>Tachybaptus dominicus</i> (Linnaeus, 1766)	Least Grebe	4, 5	BD
[<i>Podilymbus podiceps</i> (Linnaeus, 1758)]	Pied-billed Grebe	4	IO
Ciconiiformes			
Ciconiidae			
[<i>Jabiru mycteria</i> (Lichtenstein, 1819)]	Jabiru	4, 5	IO
<i>Mycteria americana</i> Linnaeus, 1758	Wood Stork	4, 5	BD
Suliformes			
Phalacrocoracidae			
[<i>Nannopterum brasilianus</i> (Gmelin, 1789)]	Neotropic Cormorant	4	IO
Anhingidae			
[<i>Anhinga anhinga</i> (Linnaeus, 1766)]	Anhinga	2, 3, 4	IO
Pelecaniformes			
Ardeidae			
[<i>Tigrisoma lineatum</i> (Boddaert, 1783)]	Rufescent Tiger-Heron	4, 5	IO
[<i>Tigrisoma fasciatum</i> (Such, 1825)] VU*	Fasciated Tiger-Heron	4	IO
<i>Agamia agami</i> (Gmelin, 1789) VU	Agami Heron	5	BD
[<i>Cochlearius cochlearius</i> (Linnaeus, 1766)]	Boat-billed Heron	4	IO
[<i>Nycticorax nycticorax</i> (Linnaeus, 1758)]	Black-crowned Night-Heron	4	IO
[<i>Butorides striata</i> (Linnaeus, 1758)]	Striated Heron	4	IO
[<i>Bubulcus ibis</i> (Linnaeus, 1758)]	Cattle Egret	4, 5	IO
[<i>Ardea cocoi</i> Linnaeus, 1766]	Cocoi Heron	4	IO
[<i>Ardea alba</i> Linnaeus, 1758]	Great Egret	4	IO
[<i>Syrigma sibilatrix</i> (Temminck, 1824)]	Whistling Heron	4	IO
[<i>Pilherodius pileatus</i> (Boddaert, 1783)]	Capped Heron	1, 4	IO
[<i>Egretta thula</i> (Molina, 1782)]	Snowy Egret	4	IO
Threskiornithidae			
[<i>Mesembrinibis cayennensis</i> (Gmelin, 1789)]	Green Ibis	4, 5	IO
[<i>Phimosus infuscatus</i> (Lichtenstein, 1823)]	Bare-faced Ibis	4	IO
<i>Theristicus caudatus</i> (Boddaert, 1783)	Buff-necked Ibis	4, 5	BD
Cathartiformes			
Cathartidae			

Taxon	English name	Source	Record type
<i>Cathartes aura</i> (Linnaeus, 1758)	Turkey Vulture	1, 2, 4, 5	BD
[<i>Cathartes burrovianus</i> Cassin, 1845]	Lesser Yellow-headed Vulture	4, 5	IO
[<i>Cathartes melambrotus</i> Wetmore, 1964]	Greater Yellow-headed Vulture	5	IO
<i>Coragyps atratus</i> (Bechstein, 1793)	Black Vulture	1, 2, 4, 5	BD
<i>Sarcoramphus papa</i> (Linnaeus, 1758)	King Vulture	1, 2, 4, 5	BD
Accipitriformes			
Accipitridae			
[<i>Leptodon cayanensis</i> (Latham, 1790)]	Gray-headed Kite	4, 5	IO
<i>Chondrohierax uncinatus</i> (Temminck, 1822)	Hook-billed Kite	4, 5	BD
[<i>Elanoides forficatus</i> (Linnaeus, 1758)]	Swallow-tailed Kite	1, 4	IO
[<i>Gampsonyx swainsonii</i> Vigors, 1825]	Pearl Kite	1, 4	IO
[<i>Elanus leucurus</i> (Vieillot, 1818)]	White-tailed Kite	4	IO
<i>Harpagus bidentatus</i> (Latham, 1790)	Double-toothed Kite	5	BD
<i>Harpagus diodon</i> (Temminck, 1823)	Rufous-thighed Kite	5	BD
<i>Accipiter superciliosus</i> (Linnaeus, 1766)	Tiny Hawk	5	BD
[<i>Accipiter striatus</i> Vieillot, 1808]	Sharp-shinned Hawk	4	IO
[<i>Accipiter bicolor</i> (Vieillot, 1817)]	Bicolored Hawk	4, 5	IO
[<i>Ictinia mississippiensis</i> (Wilson, 1811)]	Mississippi Kite	4	IO
<i>Ictinia plumbea</i> (Gmelin, 1788)	Plumbeous Kite	4, 5	BD
[<i>Busarellus nigricollis</i> (Latham, 1790)]	Black-collared Hawk	4	IO
[<i>Rostrhamus sociabilis</i> (Vieillot, 1817)]	Snail Kite	4	IO
[<i>Geranospiza caerulescens</i> (Vieillot, 1817)]	Crane Hawk	1, 4	IO
[<i>Heterospizias meridionalis</i> (Latham, 1790)]	Savanna Hawk	4	IO
<i>Urubitinga urubitinga</i> (Gmelin, 1788)	Great Black Hawk	4, 5	BD
[<i>Urubitinga coronata</i> (Vieillot, 1817)] EN, EN*	Crowned Eagle	4	IO
<i>Rupornis magnirostris</i> (Gmelin, 1788)	Roadside Hawk	1, 2, 4, 5	AD
[<i>Parabuteo unicinctus</i> (Temminck, 1824)]	Harris’s Hawk	4	IO
<i>Geranoaetus albicaudatus</i> (Vieillot, 1816)	White-tailed Hawk	2, 4, 5	BD
[<i>Geranoaetus melanoleucus</i> (Vieillot, 1819)]	Black-chested Buzzard-Eagle	4	IO
<i>Pseudastur albicollis</i> (Latham, 1790)	White Hawk	2, 4, 5	BD
<i>Buteo nitidus</i> (Latham, 1790)	Gray-lined Hawk	2, 4, 5	BD
[<i>Buteo brachyurus</i> Vieillot, 1816]	Short-tailed Hawk	4	IO
[<i>Buteo albonotatus</i> Kaup, 1847]	Zone-tailed Hawk	4	IO
[<i>Harpia harpyja</i> (Linnaeus, 1758)] NT, VU*	Harpy Eagle	4	IO
<i>Spizaetus tyrannus</i> (Wied, 1820)	Black Hawk-Eagle	4, 5	BD
[<i>Spizaetus melanoleucus</i> (Vieillot, 1816)]	Black-and-white Hawk-Eagle	2, 4	IO
<i>Spizaetus ornatus</i> (Daudin, 1800) NT	Ornate Hawk-Eagle	2, 4, 5	BD
Eurypygiiformes			
Eurypygidae			
<i>Eurypyga helias</i> (Pallas, 1781)	Sunbittern	1, 4, 5	BD
Gruiformes			
Aramidae			
[<i>Aramus guarauna</i> (Linnaeus, 1766)]	Limpkin	4	IO
Rallidae			
[<i>Micropygia schomburgkii</i> (Schomburgk, 1848)]	Ocellated Crake	1, 2, 4	IO
[<i>Aramides cajaneus</i> (Statius Müller, 1776)]	Gray-necked Wood-Rail	1, 4, 5	IO
<i>Laterallus viridis</i> (Statius Müller, 1776)	Russet-crowned Crake	1, 2, 4	AD
[<i>Laterallus melanophaeus</i> (Vieillot, 1819)]	Rufous-sided Crake	1, 4	IO
<i>Mustelirallus albigollis</i> (Vieillot, 1819)	Ash-throated Crake	4, 5	BD
[<i>Porphyrio martinicus</i> (Linnaeus, 1766)]	Purple Gallinule	4	IO
Heliornithidae			
[<i>Heliornis fulica</i> (Boddaert, 1783)]	Sungrebe	mp	IO
Charadriiformes			
Charadriidae			
[<i>Vanellus cayanus</i> (Latham, 1790)]	Pied Lapwing	4	IO
<i>Vanellus chilensis</i> (Molina, 1782)	Southern Lapwing	4, 5	BD
Scolopacidae			
[<i>Gallinago paraguaiiae</i> (Vieillot, 1816)]	South American Snipe	4	IO
[<i>Gallinago undulata</i> (Boddaert, 1783)]	Giant Snipe	4	IO
[<i>Tringa solitaria</i> Wilson, 1813]	Solitary Sandpiper	4	IO
Jacanidae			
<i>Jacana jacana</i> (Linnaeus, 1766)	Wattled Jacana	4, 5	BD
Columbiformes			
Columbidae			
[<i>Columbina minuta</i> (Linnaeus, 1766)]	Plain-breasted Ground-Dove	1, 4	IO
<i>Columbina talpacoti</i> (Temminck, 1810)	Ruddy Ground-Dove	1, 2, 3, 4, 5	BD
<i>Columbina squammata</i> (Lesson, 1831)	Scaled Dove	1, 4, 5	BD
[<i>Columbina cyanopsis</i> (Pelzeln, 1870)] CE, CR, CR*	Blue-eyed Ground-Dove	1, 4	IO

Taxon	English name	Source	Record type
<i>Claravis pretiosa</i> (Ferrari-Perez, 1886)	Blue Ground-Dove	1, 2, 3, 4, 5	AD
[<i>Uropelia campestris</i> (Spix, 1825)]	Long-tailed Ground-Dove	1, 4	IO
<i>Patagioenas speciosa</i> (Gmelin, 1789)	Scaled Pigeon	1, 2, 3, 4, 5	BD
[<i>Patagioenas picazuro</i> (Temminck, 1813)]	Picazuro Pigeon	2, 4, 5	IO
<i>Patagioenas cayennensis</i> (Bonnaterre, 1792)	Pale-vented Pigeon	1, 4, 5	BD
<i>Patagioenas plumbea</i> (Vieillot, 1818)	Plumbeous Pigeon	2, 4, 5	BD
[<i>Zenaida auriculata</i> (Des Murs, 1847)]	Eared Dove	4	IO
<i>Leptotila verreauxi</i> Bonaparte, 1855	White-tipped Dove	1, 2, 3, 4, 5	AD
<i>Leptotila rufaxilla</i> (Richard & Bernard, 1792)	Gray-fronted Dove	1, 2, 4, 5	BD
<i>Geotrygon montana</i> (Linnaeus, 1758)	Ruddy Quail-Dove	1, 3, 4, 5	BD
Cuculiformes			
Cuculidae			
[<i>Coccyzua minuta</i> (Vieillot, 1817)]	Little Cuckoo	4	IO
<i>Piaya cayana</i> (Linnaeus, 1766)	Squirrel Cuckoo	1, 2, 4, 5	BD
<i>Coccyzus euleri</i> Cabanis, 1873	Pearly-breasted Cuckoo	5	BD
[<i>Crotophaga major</i> Gmelin, 1788]	Greater Ani	4	IO
<i>Crotophaga ani</i> Linnaeus, 1758	Smooth-billed Ani	1, 2, 3, 4, 5	AD
<i>Guira guira</i> (Gmelin, 1788)	Guira Cuckoo	1, 4, 5	BD
<i>Tapera naevia</i> (Linnaeus, 1766)	Striped Cuckoo	1, 3, 4	AD
[<i>Dromococcyx phasianellus</i> (Spix, 1824)]	Pheasant Cuckoo	2, 4	IO
<i>Dromococcyx pavoninus</i> Pelzeln, 1870	Pavonine Cuckoo	2, 4, 5	BD
Strigiformes			
Tytonidae			
[<i>Tyto furcata</i> (Temminck, 1827)]	American Barn Owl	4	IO
Strigidae Leach, 1820			
<i>Megascops choliba</i> (Vieillot, 1817)	Tropical Screech-Owl	1, 4, 5	BD
<i>Megascops usta</i> (Sclater, 1858)	Austral Screech-Owl	4, 5	BD
<i>Pulsatrix perspicillata</i> (Latham, 1790)	Spectacled Owl	2, 4, 5	BD
[<i>Bubo virginianus</i> (Gmelin, 1788)]	Great Horned Owl	4	IO
[<i>Strix virgata</i> (Cassin, 1849)]	Mottled Owl	4, 5	IO
[<i>Strix huhula</i> Daudin, 1800]	Black-banded Owl	4	IO
<i>Glaucidium brasilianum</i> (Gmelin, 1788)	Ferruginous Pygmy-Owl	2, 4, 5	BD
<i>Athene cunicularia</i> (Molina, 1782)	Burrowing Owl	1, 4, 5	BD
<i>Asio clamator</i> (Vieillot, 1808)	Striped Owl	4, 5	BD
[<i>Asio stygius</i> (Wagler, 1832)]	Stygian Owl	4	IO
Nyctibiiformes			
Nyctibiidae			
[<i>Nyctibius grandis</i> (Gmelin, 1789)]	Great Potoo	4	IO
<i>Nyctibius griseus</i> (Gmelin, 1789)	Common Potoo	4, 5	BD
Caprimulgiformes			
Caprimulgidae			
<i>Antrostomus rufus</i> (Boddaert, 1783)	Rufous Nightjar	3, 4, 5	BD
<i>Lurocalis semitorquatus</i> (Gmelin, 1789)	Short-tailed Nighthawk	5	BD
<i>Nyctidromus albigollis</i> (Gmelin, 1789)	Common Pauraque	1, 2, 3, 4, 5	BD
<i>Hydropsalis parvula</i> (Gould, 1837)	Little Nightjar	4, 5	BD
<i>Hydropsalis longirostris</i> (Bonaparte, 1825)	Band-winged Nightjar	4, 5	BD
<i>Hydropsalis torquata</i> (Gmelin, 1789)	Scissor-tailed Nightjar	1, 2, 4, 5	AD
[<i>Nannochordeiles pusillus</i> (Gould, 1861)]	Least Nighthawk	4	IO
[<i>Podager nacunda</i> (Vieillot, 1817)]	Nacunda Nighthawk	4	IO
[<i>Chordeiles minor</i> (Forster, 1771)]	Common Nighthawk	4	IO
[<i>Chordeiles acutipennis</i> (Hermann, 1783)]	Lesser Nighthawk	1, 4	IO
Apodiformes			
Apodidae			
[<i>Cypseloides fumigatus</i> (Streubel, 1848)]	Sooty Swift	2, 4	IO
<i>Cypseloides senex</i> (Temminck, 1826)	Great Dusky Swift	5	BD
<i>Streptoprocne zonaris</i> (Shaw, 1796)	White-collared Swift	2, 4, 5	BD
[<i>Streptoprocne biscutata</i> (Sclater, 1866)]	Biscutate Swift	4	IO
[<i>Chaetura meridionalis</i> Hellmayr, 1907]	Sick’s Swift	4	IO
[<i>Tachornis squamata</i> (Cassin, 1853)]	Fork-tailed Palm-Swift	1, 4	IO
Trochilidae			
<i>Glaucis hirsutus</i> (Gmelin, 1788)	Rufous-breasted Hermit	1, 3, 4, 5	AD
<i>Phaethornis nattereri</i> Berlepsch, 1887	Cinnamon-throated Hermit	1, 4, 5	AD
[<i>Phaethornis ruber</i> (Linnaeus, 1758)]	Reddish Hermit	4, 5	IO
[<i>Phaethornis subochraceus</i> Todd, 1915]	Buff-bellied Hermit	4	IO
<i>Phaethornis pretrei</i> (Lesson & Delattre, 1839)	Planalto Hermit	1, 2, 3, 4, 5	BD
<i>Eupetomena macroura</i> (Gmelin, 1788)	Swallow-tailed Hummingbird	1, 2, 3, 4, 5	AD
<i>Colibri serrirostris</i> (Vieillot, 1816)	White-vented Violetear	3, 4, 5	AD
<i>Anthracothorax nigricollis</i> (Vieillot, 1817)	Black-throated Mango	1, 2, 4, 5	AD

Taxon	English name	Source	Record type
[<i>Chrysolampis mosquitus</i> (Linnaeus, 1758)]	Ruby-topaz Hummingbird	4	IO
<i>Lophornis gouldii</i> (Lesson, 1832) VU, VU*	Dot-eared Coquette	5	BD
<i>Chlorostilbon lucidus</i> (Shaw, 1812)	Glittering-bellied Emerald	3, 2, 4, 5	BD
<i>Thalurania furcata</i> (Gmelin, 1788)	Fork-tailed Woodnymph	1, 2, 3, 4, 5	AD
<i>Hylocharis cyanus</i> (Vieillot, 1818)	White-chinned Sapphire	5	BD
<i>Hylocharis chrysura</i> (Shaw, 1812)	Gilded Hummingbird	4, 5	AD
[<i>Polytmus guainumbi</i> (Pallas, 1764)]	White-tailed Goldenthrroat	4	IO
<i>Amazilia fimbriata</i> (Gmelin, 1788)	Glittering-throated Emerald	1, 2, 4, 5	BD
[<i>Heliactin bilophus</i> (Temminck, 1820)]	Horned Sungem	1, 2, 4	IO
<i>Heliomaster longirostris</i> (Audebert & Vieillot, 1801)	Long-billed Starthroat	2, 4, 5	BD
[<i>Heliomaster furcifer</i> (Shaw, 1812)]	Blue-tufted Starthroat	4, 5	IO
<i>Calliphlox amethystina</i> (Boddaert, 1783)	Amethyst Woodstar	4, 5	BD
Trogoniformes			
Trogonidae			
<i>Trogon melanurus</i> Swainson, 1838	Black-tailed Trogon	4, 5	BD
<i>Trogon viridis</i> Linnaeus, 1766	Green-backed Trogon	1, 4, 5	BD
<i>Trogon curucui</i> Linnaeus, 1766	Blue-crowned Trogon	1, 2, 3, 4, 5	AD
<i>Trogon collaris</i> Vieillot, 1817	Collared Trogon	4, 5	BD
Coraciiformes			
Alcedinidae			
<i>Megaceryle torquata</i> (Linnaeus, 1766)	Ringed Kingfisher	1, 4, 5	BD
<i>Chloroceryle amazona</i> (Latham, 1790)	Amazon Kingfisher	1, 2, 4, 5	BD
[<i>Chloroceryle aenea</i> (Pallas, 1764)]	American Pygmy Kingfisher	1, 4, 5	IO
<i>Chloroceryle americana</i> (Gmelin, 1788)	Green Kingfisher	1, 4, 5	BD
<i>Chloroceryle inda</i> (Linnaeus, 1766)	Green-and-rufous Kingfisher	2, 4, 5	BD
Momotidae			
[<i>Electron platyrhynchum</i> (Leadbeater, 1829)]	Broad-billed Motmot	1, 4	IO
<i>Momotus momota</i> (Linnaeus, 1766)	Amazonian Motmot	1, 2, 3, 4, 5	AD
Galbuliformes			
Galbulidae			
<i>Brachygalba lugubris</i> (Swainson, 1838)	Brown Jacamar	1, 2, 4	AD
<i>Galbula ruficauda</i> Cuvier, 1816	Rufous-tailed Jacamar	1, 2, 4, 5	BD
Bucconidae			
[<i>Notharchus hyperrhynchus</i> (Sclater, 1856)]	White-necked Puffbird	1	IO
<i>Notharchus tectus</i> (Boddaert, 1783)	Pied Puffbird	2, 4, 5	BD
<i>Bucco tamatia</i> Gmelin, 1788	Spotted Puffbird	4, 5	BD
<i>Nystalus striolatus</i> (Pelzeln, 1856)	Natterer’s Striolated Puffbird	4, 5	BD
<i>Nystalus chacuru</i> (Vieillot, 1816)	White-eared Puffbird	1, 2, 3, 4, 5	AD
<i>Nystalus maculatus</i> (Gmelin, 1788)	Spot-backed Puffbird	4, 5	BD
<i>Nonnula ruficapilla</i> (Tschudi, 1844)	Rufous-capped Nunlet	4, 5	BD
<i>Monasa nigrifrons</i> (Spix, 1824)	Black-fronted Nunbird	1, 2, 3, 4, 5	AD
[<i>Monasa morphoeus</i> (Hahn & Küster, 1823)]	White-fronted Nunbird	1	IO
<i>Chelidoptera tenebrosa</i> (Pallas, 1782)	Swallow-winged Puffbird	2, 4, 5	BD
Piciformes			
Ramphastidae			
<i>Ramphastos toco</i> Statius Müller, 1776	Toco Toucan	1, 4, 5	BD
<i>Ramphastos tucanus</i> Linnaeus, 1758	White-throated Toucan	5	BD
[<i>Ramphastos vitellinus</i> Lichtenstein, 1823]	Channel-billed Toucan	1, 4	IO
<i>Pteroglossus inscriptus</i> Swainson, 1822	Lettered Aracari	1, 2, 3, 4, 5	BD
[<i>Pteroglossus bitorquatus</i> Vigors, 1826] EN	Red-necked Aracari	1, 4	IO
<i>Pteroglossus castanotis</i> Gould, 1834	Chestnut-eared Aracari	1, 2, 4, 5	AD
Picidae			
[<i>Picumnus albosquamatus</i> d’Orbigny, 1840]	White-wedged Piculet	1, 4, 5	IO
<i>Melanerpes candidus</i> (Otto, 1796)	White Woodpecker	4, 5	BD
<i>Melanerpes cruentatus</i> (Boddaert, 1783)	Yellow-tufted Woodpecker	1, 2, 3, 4, 5	AD
<i>Veniliornis affinis</i> (Swainson, 1821)	Red-stained Woodpecker	5	BD
<i>Veniliornis passerinus</i> (Linnaeus, 1766)	Little Woodpecker	2, 3, 4, 5	AD
[<i>Veniliornis mixtus</i> (Boddaert, 1783)]	Checkered Woodpecker	2, 4	IO
[<i>Piculus leucolaemus</i> (Natterer & Malherbe, 1845)]	White-throated Woodpecker	4	IO
[<i>Piculus chrysochloros</i> (Vieillot, 1818)]	Golden-green Woodpecker	2, 4, 5	IO
<i>Colaptes melanochloros</i> (Gmelin, 1788)	Green-barred Woodpecker	2, 4, 5	BD
[<i>Colaptes campestris</i> (Vieillot, 1818)]	Campo Flicker	1, 4, 5	IO
<i>Celeus torquatus</i> (Boddaert, 1783)	Ringed Woodpecker	5	BD
[<i>Celeus elegans</i> (Statius Müller, 1776)]	Chestnut Woodpecker	1, 4	IO
<i>Celeus lugubris</i> (Malherbe, 1851)	Pale-crested Woodpecker	1, 2, 3, 4, 5	BD
<i>Dryocopus lineatus</i> (Linnaeus, 1766)	Lineated Woodpecker	1, 4, 5	BD
<i>Campephilus rubricollis</i> (Boddaert, 1783)	Red-necked Woodpecker	2, 4, 5	BD
[<i>Campephilus melanoleucos</i> (Gmelin, 1788)]	Crimson-crested Woodpecker	1, 4, 5	IO

Taxon	English name	Source	Record type
Cariamiformes			
Cariamidae			
<i>Cariama cristata</i> (Linnaeus, 1766)	Red-legged Seriema	1, 4, 5	BD
Falconiformes			
Falconidae			
[<i>Daptrius ater</i> Vieillot, 1816]	Black Caracara	4	IO
[<i>Caracara plancus</i> (Miller, 1777)]	Southern Caracara	1, 4, 5	IO
[<i>Milvago chimachima</i> (Vieillot, 1816)]	Yellow-headed Caracara	1, 4	IO
<i>Herpetotheres cachinnans</i> (Linnaeus, 1758)	Laughing Falcon	1, 2, 4, 5	BD
<i>Micrastur ruficollis</i> (Vieillot, 1817)	Barred Forest-Falcon	2, 4, 5	BD
<i>Micrastur semitorquatus</i> (Vieillot, 1817)	Collared Forest-Falcon	1, 4, 5	BD
[<i>Falco sparverius</i> Linnaeus, 1758]	American Kestrel	2, 4, 5	IO
<i>Falco rufigularis</i> Daudin, 1800	Bat Falcon	1, 2, 4, 5	BD
[<i>Falco femoralis</i> Temminck, 1822]	Applomado Falcon	4	IO
Psittaciformes			
Psittacidae			
[<i>Anodorhynchus hyacinthinus</i> (Latham, 1790)] VU	Hyacinth Macaw	1, 4, 5	IO
<i>Ara ararauna</i> (Linnaeus, 1758)	Blue-and-yellow Macaw	1, 2, 4, 5	BD
<i>Ara chloropterus</i> Gray, 1859	Red-and-green Macaw	1, 2, 4, 5	BD
[<i>Orthopsittaca manilatus</i> (Boddaert, 1783)]	Red-bellied Macaw	1, 4, 5	IO
[<i>Primolius maracana</i> (Vieillot, 1816)] NT	Blue-winged Macaw	4	IO
[<i>Primolius auricollis</i> (Cassin, 1853)]	Yellow-collared Macaw	5	IO
<i>Diopsittaca nobilis</i> (Linnaeus, 1758)	Red-shouldered Macaw	1, 2, 4, 5	BD
[<i>Psittacara leucophthalmus</i> (Statius Müller, 1776)]	White-eyed Parakeet	1, 4, 5	IO
<i>Aratinga weddellii</i> (Deville, 1851)	Dusky-headed Parakeet	2, 4, 5	BD
<i>Eupsittula aurea</i> (Gmelin, 1788)	Peach-fronted Parakeet	1, 2, 4, 5	BD
[<i>Forpus xanthopterygius</i> (Spix, 1824)]	Blue-winged Parrotlet	4	IO
<i>Brotogeris chiriri</i> (Vieillot, 1818)	Yellow-chevroned Parakeet	1, 2, 3, 4, 5	AD
[<i>Alipiopsitta xanthops</i> (Spix, 1824)] CE, NT	Yellow-faced Parrot	4	IO
<i>Pionus menstruus</i> (Linnaeus, 1766)	Blue-headed Parrot	1, 2, 4, 5	BD
<i>Amazona amazonica</i> (Linnaeus, 1766)	Orange-winged Parrot	4, 5	BD
[<i>Amazona aestiva</i> (Linnaeus, 1758)]	Turquoise-fronted Parrot	4, 5	IO
Passeriformes			
Thamnophilidae			
[<i>Microrhopias quixensis</i> (Cornalia, 1849)]	Dot-winged Antwren	2, 4	IO
<i>Myrmophylax atrothorax</i> (Boddaert, 1783)	Black-throated Antbird	1, 2, 4, 5	AD
<i>Formicivora grisea</i> (Boddaert, 1783)	White-fringed Antwren	1, 2, 3, 4, 5	AD
<i>Formicivora rufa</i> (Wied, 1831)	Rusty-backed Antwren	1, 2, 3, 4, 5	AD
[<i>Isleria hauxwelli</i> (Sclater, 1857)]	Plain-throated Antwren	1, 4	IO
<i>Dysithamnus mentalis</i> (Temminck, 1823)	Plain Antvireo	1, 2, 4, 5	BD
<i>Herpsilochmus longirostris</i> Pelzeln, 1868 CE	Large-billed Antwren	4, 5	BD
<i>Thamnophilus doliatus</i> (Linnaeus, 1764)	Barred Antshrike	1, 2, 4, 5	BD
[<i>Thamnophilus torquatus</i> Swainson, 1825]	Rufous-winged Antshrike	1, 4	IO
<i>Thamnophilus schistaceus</i> d'Orbigny, 1835	Plain-winged Antshrike	5	BD
[<i>Thamnophilus stictocephalus</i> Pelzeln, 1868]	Natterer's Slaty-Antshrike	1, 2	IO
<i>Thamnophilus pelzelni</i> Hellmayr, 1924	Planalto Slaty-Antshrike	4, 5	AD
[<i>Thamnophilus caerulescens</i> Vieillot, 1816]	Variable Antshrike	1	IO
<i>Thamnophilus aethiops</i> Sclater, 1858	White-shouldered Antshrike	5	BD
<i>Thamnophilus amazonicus</i> Sclater, 1858	Amazonian Antshrike	5	AD
[<i>Cymbilaimus lineatus</i> (Leach, 1814)]	Fasciated Antshrike	1	IO
[<i>Taraba major</i> (Vieillot, 1816)]	Great Antshrike	1, 2, 3, 4, 5	IO
[<i>Hypocnemoides maculicauda</i> (Pelzeln, 1868)]	Band-tailed Antbird	2, 4	IO
[<i>Myrmoborus myotherinus</i> (Spix, 1825)]	Black-faced Antbird	1, 4	IO
<i>Pyriglena leuconota</i> (Spix, 1824)	White-backed Fire-eye	1, 2, 3, 4, 5	AD
[<i>Cercomacroides nigrescens</i> (Cabanis & Heine, 1859)]	Blackish Antbird	1, 4	IO
<i>Hypocnemis ochrogyna</i> Zimmer, 1932 VU*	Rondonia Warbling-Antbird	2, 4, 5	BD
<i>Willisornis poecilinotus</i> (Cabanis, 1847)	Common Scale-backed Antbird	1, 4, 5	AD
[<i>Rhegmatorhina hoffmannsi</i> (Hellmayr, 1907)] NT	White-breasted Antbird	1, 4	IO
Melanopareiidae			
<i>Melanopareia torquata</i> (Wied, 1831) CE	Collared Crescentchest	1, 2, 4, 5	BD
Conopophagidae			
[<i>Conopophaga lineata</i> (Wied, 1831)]	Rufous Gnateater	1, 4	IO
Dendrocolaptidae			
<i>Dendrocincla fuliginosa</i> (Vieillot, 1818)	Plain-brown Woodcreeper	1, 4, 5	AD
<i>Sittasomus griseicapillus</i> (Vieillot, 1818)	Olivaceous Woodcreeper	1, 2, 3, 4, 5	AD
[<i>Glyphorhynchus spirurus</i> (Vieillot, 1819)]	Wedge-billed Woodcreeper	1, 4	IO
<i>Xiphorhynchus guttatoides</i> (Lafresnaye, 1850)	Lafresnaye's Woodcreeper	1, 2, 3, 4, 5	AD
[<i>Dendroplex picus</i> (Gmelin, 1788)]	Straight-billed Woodcreeper	1, 4, 5	IO

Taxon	English name	Source	Record type
[<i>Lepidocolaptes angustirostris</i> (Vieillot, 1818)]	Narrow-billed Woodcreeper	1, 4	IO
[<i>Lepidocolaptes fuscicapillus</i> (Pelzeln, 1868)]	Rondonia Woodcreeper	2, 4, 5	IO
[<i>Dendrocolaptes platyrostris</i> Spix, 1825]	Planalto Woodcreeper	2, 4	IO
[<i>Hylexetastes uniformis</i> Hellmayr, 1909]	Uniform Woodcreeper	1, 4	IO
Xenopidae			
<i>Xenops rutilans</i> Temminck, 1821	Streaked Xenops	1, 4, 5	BD
Furnariidae			
<i>Furnarius rufus</i> (Gmelin, 1788)	Rufous Hornero	1, 2, 3, 4, 5	AD
[<i>Lochmias nematura</i> (Lichtenstein, 1823)]	Sharp-tailed Streamcreeper	4	IO
[<i>Clibanornis rectirostris</i> (Wied, 1831)] CE	Chestnut-capped Foliage-gleaner	4	IO
[<i>Syndactyla dimidiata</i> (Pelzeln, 1859)]	Russet-mantled Foliage-gleaner	1, 4	IO
[<i>Phacellodomus rufifrons</i> (Wied, 1821)]	Rufous-fronted Thornbird	4	IO
[<i>Phacellodomus ruber</i> (Vieillot, 1817)]	Greater Thornbird	4	IO
<i>Synallaxis frontalis</i> Pelzeln, 1859	Sooty-fronted Spinetail	1, 4, 5	BD
<i>Synallaxis albescens</i> Temminck, 1823	Pale-breasted Spinetail	1, 2, 4	AD
[<i>Synallaxis rutilans</i> Temminck, 1823]	Ruddy Spinetail	1, 4	IO
[<i>Synallaxis gujanensis</i> (Gmelin, 1789)]	Plain-crowned Spinetail	1, 4	IO
[<i>Cranioleuca vulpina</i> (Pelzeln, 1856)]	Rusty-backed Spinetail	1, 4	IO
Pipridae Rafinesque, 1815			
<i>Neopelma pallescens</i> (Lafresnaye, 1853)	Pale-bellied Tyrant-Manakin	1, 2, 4, 5	AD
[<i>Tyranneutes stolzmanni</i> (Hellmayr, 1906)]	Dwarf Tyrant-Manakin	1, 4	IO
<i>Pipra fasciicauda</i> Hellmayr, 1906	Band-tailed Manakin	1, 2, 3, 4, 5	AD
<i>Manacus manacus</i> (Linnaeus, 1766)	White-bearded Manakin	1, 2, 3, 4, 5	AD
<i>Machaeropterus pyrocephalus</i> (Sclater, 1852)	Fiery-capped Manakin	1, 2, 3, 4, 5	AD
<i>Chiroxiphia pareola</i> (Linnaeus, 1766)	Blue-backed Manakin	5	AD
<i>Antilophia galeata</i> (Lichtenstein, 1823) CE	Helmeted Manakin	1, 2, 4, 5	AD
Oxyruncidae			
<i>Oxyruncus cristatus</i> Swainson, 1821	Sharpbill	2, 4, 5	BD
Onychorhynchidae			
[<i>Terenotriccus erythrurus</i> (Cabanis, 1847)]	Ruddy-tailed Flycatcher	1	IO
Tityridae			
[<i>Schiffornis turdina</i> (Wied, 1831)]	Thrush-like Schiffornis	4	IO
[<i>Tityra inquisitor</i> (Lichtenstein, 1823)]	Black-crowned Tityra	4	IO
[<i>Tityra cayana</i> (Linnaeus, 1766)]	Black-tailed Tityra	1, 4, 5	IO
<i>Tityra semifasciata</i> (Spix, 1825)	Masked Tityra	1, 2, 3, 4, 5	AD
[<i>Pachyramphus viridis</i> (Vieillot, 1816)]	Green-backed Becard	4	IO
[<i>Pachyramphus polychopterus</i> (Vieillot, 1818)]	White-winged Becard	1, 4, 5	IO
Cotingidae Bonaparte, 1849			
[<i>Gymnoderus foetidus</i> (Linnaeus, 1758)]	Bare-necked Fruitcrow	5	IO
[<i>Xipholena punicea</i> (Pallas, 1764)]	Pompadour Cotinga	1, 4	IO
Pipritidae			
[<i>Piprites chloris</i> (Temminck, 1822)]	Wing-barred Piprites	1, 4	IO
Platyrrinchidae			
<i>Platyrrinchus mystaceus</i> Vieillot, 1818	White-throated Spadebill	2, 4, 5	BD
Rhynchocyclidae			
<i>Mionectes oleagineus</i> (Lichtenstein, 1823)	Ochre-bellied Flycatcher	1, 3, 4, 5	BD
<i>Leptopogon amaurocephalus</i> Tschudi, 1846	Sepia-capped Flycatcher	2, 3, 4, 5	AD
<i>Corythopis delalandi</i> (Lesson, 1830)	Southern Antpipit	4, 5	AD
[<i>Tolmomyias sulphurescens</i> (Spix, 1825)]	Yellow-olive Flycatcher	1, 2, 3, 4, 5	IO
<i>Tolmomyias assimilis</i> (Pelzeln, 1868)	Yellow-margined Flycatcher	5	BD
<i>Tolmomyias flaviventris</i> (Wied, 1831)	Yellow-breasted Flycatcher	5	AD
[<i>Todirostrum cinereum</i> (Linnaeus, 1766)]	Common Tody-Flycatcher	1, 4	IO
<i>Poecilotriccus latirostris</i> (Pelzeln, 1868)	Rusty-fronted Tody-Flycatcher	1, 2, 3, 4	AD
<i>Myiornis ecaudatus</i> (d'Orbigny & Lafresnaye, 1837)	Short-tailed Pygmy-Tyrant	5	BD
<i>Hemitriccus minor</i> (Snethlage, 1907)	Snethlage's Tody-Tyrant	5	BD
<i>Hemitriccus flammulatus</i> Berlepsch, 1901	Flammulated Pygmy-Tyrant	4, 5	AD
<i>Hemitriccus striaticollis</i> (Lafresnaye, 1853)	Stripe-necked Tody-Tyrant	1, 2, 3, 4, 5	AD
<i>Hemitriccus margaritaceiventer</i> (d'Orbigny & Lafresnaye, 1837)	Pearly-vented Tody-tyrant	1, 2, 4, 5	BD
Tyrannidae			
<i>Hirundinea ferruginea</i> (Gmelin, 1788)	Cliff Flycatcher	2, 4, 5	BD
[<i>Euscarthmus meloryphus</i> Wied, 1831]	Tawny-crowned Pygmy-Tyrant	2, 4	IO
[<i>Euscarthmus rufomarginatus</i> (Pelzeln, 1868)] CE, NT	Rufous-sided Pygmy-Tyrant	2, 4	IO
<i>Ornithion inerme</i> Hartlaub, 1853	White-lored Tyrannulet	5	BD
<i>Camptostoma obsoletum</i> (Temminck, 1824)	Southern Beardless-Tyrannulet	1, 4, 5	BD
<i>Elaenia flavogaster</i> (Thunberg, 1822)	Yellow-bellied Elaenia	1, 2, 3, 4, 5	BD
<i>Elaenia chilensis</i> Hellmayr, 1927	Chilean Elaenia	3, 4, 5	AD
<i>Elaenia parvirostris</i> Pelzeln, 1868	Small-billed Elaenia	1, 4, 5	AD
[<i>Elaenia cristata</i> Pelzeln, 1868]	Plain-crested Elaenia	1, 4, 5	IO

Taxon	English name	Source	Record type
<i>Elaenia chiriquensis</i> Lawrence, 1865	Lesser Elaenia	2, 3, 4, 5	AD
[<i>Suiriri suiriri</i> (Vieillot, 1818)]	Suiriri Flycatcher	1, 4	IO
[<i>Suiriri affinis</i> (Burmeister, 1856)] NT	Chapada Flycatcher	4	IO
<i>Myiopagis gaimardii</i> (d’Orbigny, 1839)	Forest Elaenia	2, 4, 5	AD
<i>Myiopagis caniceps</i> (Swainson, 1835)	Gray Elaenia	2, 4, 5	BD
[<i>Myiopagis viridicata</i> (Vieillot, 1817)]	Greenish Elaenia	3, 2, 4	IO
<i>Phaeomyias murina</i> (Spix, 1825)	Mouse-colored Tyrannulet	1, 2, 3, 4, 5	AD
[<i>Phyllomyias fasciatus</i> (Thunberg, 1822)]	Planalto Tyrannulet	2, 4	IO
[<i>Culicivora caudacuta</i> (Vieillot, 1818)] VU	Sharp-tailed Tyrant	1, 4	IO
<i>Attila bolivianus</i> Lafresnaye, 1848	Dull-capped Attila	1, 2, 3, 4, 5	AD
<i>Legatus leucophaeus</i> (Vieillot, 1818)	Piratic Flycatcher	1, 2, 4, 5	BD
[<i>Ramphotrigon ruficauda</i> (Spix, 1825)]	Rufous-tailed Flatbill	1, 4	IO
<i>Myiarchus tuberculifer</i> (d’Orbigny & Lafresnaye, 1837)	Dusky-capped Flycatcher	2, 4, 5	BD
<i>Myiarchus swainsoni</i> Cabanis & Heine, 1859	Swainson’s Flycatcher	1, 3, 4, 5	AD
<i>Myiarchus ferox</i> (Gmelin, 1789)	Short-crested Flycatcher	1, 2, 4, 5	BD
<i>Myiarchus tyrannulus</i> (Statius Müller, 1776)	Brown-crested Flycatcher	2, 3, 4, 5	AD
<i>Sirystes sibilator</i> (Vieillot, 1818)	Sibilant Sirystes	2, 4, 5	BD
<i>Rhytipterna simplex</i> (Lichtenstein, 1823)	Grayish Mourner	5	BD
<i>Casiornis rufus</i> (Vieillot, 1816)	Rufous Casiornis	2, 3, 4, 5	BD
<i>Pitangus sulphuratus</i> (Linnaeus, 1766)	Great Kiskadee	1, 2, 4, 5	BD
[<i>Philohydor lictor</i> (Lichtenstein, 1823)]	Lesser Kiskadee	1, 4	IO
[<i>Machetornis rixosa</i> (Vieillot, 1819)]	Cattle Tyrant	1, 4	IO
<i>Myiodynastes maculatus</i> (Statius Müller, 1776)	Streaked Flycatcher	1, 4, 5	BD
<i>Megarynychus pitangua</i> (Linnaeus, 1766)	Boat-billed Flycatcher	1, 2, 3, 4, 5	BD
<i>Myiozetetes cayanensis</i> (Linnaeus, 1766)	Rusty-margined Flycatcher	1, 2, 4, 5	BD
[<i>Tyrannus albogularis</i> Burmeister, 1856]	White-throated Kingbird	4	IO
<i>Tyrannus melancholicus</i> Vieillot, 1819	Tropical Kingbird	1, 4, 5	BD
<i>Tyrannus savana</i> Daudin, 1802	Fork-tailed Flycatcher	1, 4, 5	BD
<i>Griseotyrannus aurantioatrocristatus</i> (d’Orbigny & Lafresnaye, 1837)	Crowned Slaty Flycatcher	4, 5	BD
<i>Empidonomus varius</i> (Vieillot, 1818)	Variegated Flycatcher	2, 4, 5	BD
[<i>Colonia colonus</i> (Vieillot, 1818)]	Long-tailed Tyrant	1, 4	IO
<i>Myiophobus fasciatus</i> (Statius Müller, 1776)	Bran-colored Flycatcher	1, 2, 4, 5	BD
[<i>Sublegatus modestus</i> (Wied, 1831)]	Southern Scrub-Flycatcher	2, 3, 4	IO
<i>Pyrocephalus rubinus</i> (Boddaert, 1783)	Vermilion Flycatcher	4, 5	BD
[<i>Gubernetes yetapa</i> (Vieillot, 1818)]	Streamer-tailed Tyrant	1, 4	IO
<i>Cnemotriccus fuscatus</i> (Wied, 1831)	Fuscous Flycatcher	2, 3, 4, 5	BD
<i>Lathrotriccus euleri</i> (Cabanis, 1868)	Euler’s Flycatcher	1, 2, 4, 5	BD
[<i>Knipolegus lophotes</i> Boie, 1828]	Crested Black-Tyrant	4	IO
<i>Xolmis cinereus</i> (Vieillot, 1816)	Gray Monjita	1, 4, 5	BD
[<i>Xolmis velatus</i> (Lichtenstein, 1823)]	White-rumped Monjita	4	IO
Vireonidae			
<i>Cyclarhis gujanensis</i> (Gmelin, 1789)	Rufous-browed Peppershrike	1, 2, 3, 4, 5	AD
[<i>Pachysylvia muscicapina</i> (Sclater & Salvin, 1873)]	Buff-cheeked Greenlet	1	IO
<i>Vireo olivaceus</i> (Linnaeus, 1766)	Red-eyed Vireo	5	AD
<i>Vireo chivi</i> (Vieillot, 1817)	Chivi Vireo	1, 2, 3, 4, 5	AD
Corvidae			
<i>Cyanocorax cyanomelas</i> (Vieillot, 1818)	Purplish Jay	1, 2, 3, 4, 5	AD
<i>Cyanocorax cristatellus</i> (Temminck, 1823) CE	Curl-crested Jay	1, 2, 4, 5	BD
Hirundinidae			
[<i>Pygochelidon cyanoleuca</i> (Vieillot, 1817)]	Blue-and-white Swallow	4	IO
<i>Stelgidopteryx ruficollis</i> (Vieillot, 1817)	Southern Rough-winged Swallow	1, 2, 3, 4, 5	BD
<i>Progne tapera</i> (Vieillot, 1817)	Brown-chested Martin	4, 5	BD
<i>Progne chalybea</i> (Gmelin, 1789)	Gray-breasted Martin	4, 5	BD
[<i>Tachycineta leucorrhoa</i> (Vieillot, 1817)]	White-rumped Swallow	4	IO
[<i>Hirundo rustica</i> Linnaeus, 1758]	Barn Swallow	4	IO
Troglodytidae			
<i>Troglodytes musculus</i> Naumann, 1823	Southern House Wren	1, 2, 4, 5	BD
<i>Campylorhynchus turdinus</i> (Wied, 1831)	Thrush-like Wren	1, 2, 3, 4, 5	AD
<i>Pheugopedius genibarbis</i> (Swainson, 1838)	Moustached Wren	1, 2, 3, 4, 5	AD
[<i>Cantorchilus leucotis</i> (Lafresnaye, 1845)]	Buff-breasted Wren	1, 4	IO
Donacobiidae			
[<i>Donacobius atricapilla</i> (Linnaeus, 1766)]	Black-capped Donacobius	4	IO
Poliophtilidae			
[<i>Poliophtila dumicola</i> (Vieillot, 1817)]	Masked Gnatcatcher	1, 4, 5	IO
Turdidae			
<i>Catharus fuscescens</i> (Stephens, 1817)	Veery	2, 4, 5	AD
<i>Turdus leucomelas</i> Vieillot, 1818	Pale-breasted Thrush	1, 2, 3, 4, 5	AD
[<i>Turdus fumigatus</i> Lichtenstein, 1823]	Cocoa Thrush	2, 4	IO
<i>Turdus hauxwelli</i> Lawrence, 1869	Hauxwell’s Thrush	5	AD

Taxon	English name	Source	Record type
<i>Turdus rufiventris</i> Vieillot, 1818	Rufous-bellied Thrush	1, 4, 5	BD
<i>Turdus amaurochalinus</i> Cabanis, 1850	Creamy-bellied Thrush	1, 2, 4, 5	AD
[<i>Turdus albicollis</i> Vieillot, 1818]	White-necked Thrush	1, 4	IO
Mimidae			
<i>Mimus saturninus</i> (Lichtenstein, 1823)	Chalk-browed Mockingbird	1, 2, 4, 5	AD
Passerellidae			
<i>Zonotrichia capensis</i> (Statius Müller, 1776)	Rufous-collared Sparrow	2, 4, 5	BD
<i>Ammodramus humeralis</i> (Bosc, 1792)	Grassland Sparrow	1, 2, 4, 5	BD
<i>Arremon taciturnus</i> (Hermann, 1783)	Pectoral Sparrow	1, 2, 4, 5	AD
<i>Arremon flavirostris</i> Swainson, 1838	Saffron-billed Sparrow	4, 5	BD
Parulidae			
[<i>Setophaga pitaiyumi</i> (Vieillot, 1817)]	Tropical Parula	1, 2, 4	IO
[<i>Geothlypis aequinoctialis</i> (Gmelin, 1789)]	Masked Yellowthroat	1, 2, 4, 5	IO
<i>Basileuterus culicivorus</i> (Deppe, 1830)	Golden-crowned Warbler	1, 2, 4, 5	BD
<i>Myiothlypis flaveola</i> Baird, 1865	Flavescent Warbler	1, 2, 4, 5	BD
[<i>Myiothlypis leucophrys</i> (Pelzeln, 1868)] CE	White-striped Warbler	4	IO
Icteridae			
[<i>Psarocolius decumanus</i> (Pallas, 1769)]	Crested Oropendola	2, 4	IO
[<i>Procacicus solitarius</i> (Vieillot, 1816)]	Solitary Black Cacique	4	IO
[<i>Cacicus haemorrhous</i> (Linnaeus, 1766)]	Red-rumped Cacique	1, 4	IO
<i>Cacicus cela</i> (Linnaeus, 1758)	Yellow-rumped Cacique	1, 2, 3, 4, 5	BD
<i>Icterus pyrrhopterus</i> (Vieillot, 1819)	Variable Oriole	1, 2, 4, 5	BD
<i>Icterus croconotus</i> (Wagler, 1829)	Orange-backed Troupial	1, 2, 3, 4, 5	BD
<i>Gnorimopsar chopi</i> (Vieillot, 1819)	Chopi Blackbird	1, 2, 3, 4, 5	AD
[<i>Molothrus oryzivorus</i> (Gmelin, 1788)]	Giant Cowbird	1, 2, 4	IO
<i>Molothrus bonariensis</i> (Gmelin, 1789)	Shiny Cowbird	1, 4, 5	BD
Thraupidae			
[<i>Porphyrospiza caerulescens</i> (Wied, 1830)] CE, NT	Blue Finch	2, 4	IO
<i>Neothraupis fasciata</i> (Lichtenstein, 1823) CE, NT	White-banded Tanager	1, 4, 5	AD
<i>Cissopis leverianus</i> (Gmelin, 1788)	Magpie Tanager	1, 2, 3, 4, 5	AD
<i>Schistochlamys melanopis</i> (Latham, 1790)	Black-faced Tanager	1, 2, 3, 4, 5	AD
[<i>Paroaria capitata</i> (d’Orbigny & Lafresnaye, 1837)]	Yellow-billed Cardinal	1, 4	IO
<i>Tangara mexicana</i> (Linnaeus, 1766)	Turquoise Tanager	1, 2, 4, 5	BD
[<i>Tangara chilensis</i> (Vigors, 1832)]	Paradise Tanager	1, 4	IO
<i>Tangara sayaca</i> (Linnaeus, 1766)	Sayaca Tanager	1, 2, 4, 5	BD
<i>Tangara palmarum</i> (Wied, 1821)	Palm Tanager	1, 2, 4, 5	BD
[<i>Tangara cyanicollis</i> (d’Orbigny & Lafresnaye, 1837)]	Blue-necked Tanager	1, 4	IO
<i>Tangara cayana</i> (Linnaeus, 1766)	Burnished-buff Tanager	1, 2, 4, 5	BD
[<i>Conirostrum speciosum</i> (Temminck, 1824)]	Chestnut-vented Conebill	4	IO
<i>Sicalis citrina</i> Pelzeln, 1870	Stripe-tailed Yellow-Finch	4, 5	BD
[<i>Sicalis flaveola</i> (Linnaeus, 1766)]	Saffron Finch	1, 4	IO
[<i>Chlorophanes spiza</i> (Linnaeus, 1758)]	Green Honeycreeper	1, 4	IO
[<i>Hemithraupis flavicollis</i> (Vieillot, 1818)]	Yellow-backed Tanager	1, 4	IO
<i>Hemithraupis guira</i> (Linnaeus, 1766)	Guira Tanager	1, 2, 4, 5	BD
<i>Volatinia jacarina</i> (Linnaeus, 1766)	Blue-black Grassquit	1, 2, 3, 4, 5	AD
<i>Eucometis penicillata</i> (Spix, 1825)	Gray-headed Tanager	2, 4, 5	BD
<i>Coryphospingus cucullatus</i> (Statius Müller, 1776)	Red-crested Finch	2, 3, 4, 5	BD
[<i>Lanio versicolor</i> (d’Orbigny & Lafresnaye, 1837)]	White-winged Shrike-Tanager	1, 4	IO
<i>Lanio luctuosus</i> (d’Orbigny & Lafresnaye, 1837)	White-shouldered Tanager	2, 4, 5	BD
<i>Lanio cristatus</i> (Linnaeus, 1766)	Flame-crested Tanager	5	BD
<i>Tachyphonus rufus</i> (Boddaert, 1783)	White-lined Tanager	1, 2, 3, 4, 5	AD
<i>Ramphocelus carbo</i> (Pallas, 1764)	Silver-beaked Tanager	1, 2, 3, 4, 5	AD
[<i>Charitospiza eucosma</i> Oberholser, 1905] CE, NT	Coal-crested Finch	4	IO
<i>Tersina viridis</i> (Illiger, 1811)	Swallow Tanager	1, 2, 4, 5	BD
<i>Cyanerpes caeruleus</i> (Linnaeus, 1758)	Purple Honeycreeper	1, 4	BD
<i>Cyanerpes cyaneus</i> (Linnaeus, 1766)	Red-legged Honeycreeper	1, 2, 4, 5	BD
<i>Dacnis cayana</i> (Linnaeus, 1766)	Blue Dacnis	1, 2, 4, 5	BD
[<i>Dacnis lineata</i> (Gmelin, 1789)]	Black-faced Dacnis	1, 4	IO
[<i>Coereba flaveola</i> (Linnaeus, 1758)]	Bananaquit	1, 4	IO
<i>Tiaris fuliginosus</i> (Wied, 1830)	Sooty Grassquit	3, 4	AD
[<i>Sporophila lineola</i> (Linnaeus, 1758)]	Lined Seed eater	4	IO
<i>Sporophila plumbea</i> (Wied, 1830)	Plumbeous Seed eater	4, 5	BD
[<i>Sporophila collaris</i> (Boddaert, 1783)]	Rusty-collared Seed eater	4	IO
[<i>Sporophila nigricollis</i> (Vieillot, 1823)]	Yellow-bellied Seed eater	1, 4, 5	IO
<i>Sporophila caerulescens</i> (Vieillot, 1823)	Double-collared Seed eater	2, 4, 5	BD
[<i>Sporophila leucoptera</i> (Vieillot, 1817)]	White-bellied Seed eater	1, 4, 5	IO
[<i>Sporophila angolensis</i> (Linnaeus, 1766)]	Chestnut-bellied Seed-Finch	1, 2, 3, 4	IO
[<i>Sporophila maximiliani</i> (Cabanis, 1851)] VU, CR*	Great-billed Seed-Finch	4	IO

Taxon	English name	Source	Record type
[<i>Emberizoides herbicola</i> (Vieillot, 1817)]	Wedge-tailed Grass-Finch	1, 2, 4	IO
<i>Saltatricula atricollis</i> (Vieillot, 1817) CE	Black-throated Saltator	1, 2, 3, 4, 5	AD
<i>Saltator maximus</i> (Statius Müller, 1776)	Buff-throated Saltator	1, 2, 3, 4, 5	BD
[<i>Saltator coerulescens</i> Vieillot, 1817]	Grayish Saltator	4, 5	IO
<i>Saltator similis</i> d'Orbigny & Lafresnaye, 1837	Green-winged Saltator	4, 5	BD
<i>Cypsnagra hirundinacea</i> (Lesson, 1831) CE	White-rumped Tanager	1, 2, 4, 5	AD
Cardinalidae			
<i>Piranga flava</i> (Vieillot, 1822)	Hepatic Tanager	1, 2, 4, 5	BD
[<i>Cyanoloxia brissonii</i> (Lichtenstein, 1823)]	Ultramarine Grosbeak	1, 2, 4	IO
Fringillidae			
<i>Euphonia chlorotica</i> (Linnaeus, 1766)	Purple-throated Euphonia	2, 4, 5	BD
[<i>Euphonia violacea</i> (Linnaeus, 1758)]	Violaceous Euphonia	1, 4	IO
<i>Euphonia lanirostris</i> d'Orbigny & Lafresnaye, 1837	Thick-billed Euphonia	4, 5	BD
[<i>Euphonia rufiventris</i> (Vieillot, 1819)]	Rufous-bellied Euphonia	1, 4	IO
Estrildidae			
[<i>Estrilda astrild</i> (Linnaeus, 1758)]	Common Waxbill	mp	IO

colonization of the sampled areas. Less represented at EESA, but still present, are species typical of Chaco and Pantanal wetland, such as *Celeus lugubris* (Malherbe, 1851) and *Ortalis canicollis* (Wagler, 1830), in addition to *Phaethornis subochraceus* Todd, 1915, recorded by Valadão (2012), a species closely associated to Chiquitanos dry forests (Vasconcelos and Hoffmann 2006).

We call attention to the elevational gradient of EESA. Our field survey evidenced the influence of altitudinal variation on the vegetation formations and consequently on the composition of the bird communities, which probably contributed to the high richness observed. According to Rosenzweig (1995), although the change in species composition along elevational gradients is a known fact, its relation to species' distribution patterns is not yet fully understood.

We found most Amazonian species at low elevations, from 220 to 400 m. Other species, like *Piranga flava* (Vieillot, 1822), *Hirundinea ferruginea* (Gmelin, 1788), and several Cerrado endemics, like *Saltatricula atricollis*, *Cypsnagra hyrundinacea* and *Neothraupis fasciata*, we recorded above 500 m in open *cerrado*. We observed a possible altitudinal replacement in some taxa, related to the variation of vegetation at different altitudes. It is the case with *Formicivora rufa* and *F. grisea*, also observed by Willis and Oniki (1990), and with *Nystalus maculatus*



Figure 6. Record for *Oxyruncus cristatus* at Estação Ecológica da Serra das Araras. First documented record of the species for the state of Mato Grosso, Brazil. (Photo: BDV).

(Gmelin, 1788) and *N. chacuru* (Vieillot, 1816). In both cases, the second species of the pair were recorded in higher elevations and more open *cerrado* in EESA. We suggest thorough evaluations regarding the influence of the altitudinal gradient and the use and selection of habitats by birds in the EESA.

In our survey, conducted about 35 years after the creation of EESA, we noted the absence and/or low density, in area A, of some taxa mentioned by Silva and Oniki (1988) and Willis and Oniki (1990). Species associated

Table 4. Tertiary list including birds recorded at Estação Ecológica da Serra das Araras with no documented evidence, imprecise identification or locality, and of improbable occurrence in the area.

<i>Netta peposaca</i> (Vieillot, 1816): Species listed by Valadão (2012). No context given. A southern migrant, probably a vagrant at EESA.
<i>Chaetura egregia</i> Todd, 1916: Species listed by Willis and Oniki (1990) as of dubious identification.
<i>Chaetura chapmani</i> Hellmayr, 1907: Species listed by Willis and Oniki (1990) as of dubious identification.
<i>Notharchus macrorhynchos</i> (Gmelin, 1788): Listed by Valadão (2012). Record outside taxon's known geographical range. Probable nomenclatural confusion. <i>Notharchus macrorhynchos</i> was listed by Silva and Oniki (1988), before the taxon was split; this record is included in our primary list as <i>N. hyperrhynchus</i> .
<i>Epinecrophylla haematonota</i> (Sclater, 1857): Listed by Valadão (2012). Record outside taxon's known geographical range. Even considering the taxonomic revision of the <i>haematonota</i> complex, no taxon of this group is likely to occur at EESA, see Whitney et al. (2013).
<i>Thamnophilus punctatus</i> (Shaw, 1809): Listed by Valadão (2012). Record outside taxon's known geographical range. Probable nomenclatural confusion. The records of <i>T. punctatus</i> presented by Silva and Oniki (1988), Willis and Oniki (1990) and Oniki and Oliveira (2002) actually refer to <i>Thamnophilus pelzelni</i> Hellmayr, 1924, see Isler et al. (1997) and Piacentini et al. (2015).
<i>Schiffornis</i> sp. Bonaparte, 1854: Listed by Silva and Oniki (1988) only at genus level.
<i>Icterus hauxwelli</i> : Listed by Willis and Oniki (1990). Taxon not considered valid. Currently treated as a variation of <i>Icterus croconotus</i> (Wagler 1829), see Mallet-Rodrigues (2008), Lopes et al. (2009) and Piacentini et al. (2015).

with altered areas, like *Gnorimopsar chopi* and *Furnarius rufus*, do not occur in this area today, due to the environmental changes brought about by the creation of the protected area. According to Pinheiro and Durigan (2009), anthropic pressure precludes some *campo* and savanna vegetation from reaching the edaphoclimatic climax of highest phytomass. Cessation of agricultural activities, as well as protection against wild fires, enable a gradual evolution from open formations to denser ones, resulting in a considerable increase in carbon stock.

However, some species typical of *cerrado* lost their habitats with the increasing density of the vegetation in some areas of EESA, where forest species were favored. Similar results were observed in state of São Paulo by Willis (2006). For example, *S. atricollis*, *C. hirundinacea* (Silva and Oniki 1988, Willis and Oniki 1990, Valadão 2012) and *N. fasciata* (Silva and Oniki 1988, Valadão 2012), previously recorded in area A, were not detected there in the course of our inventory.

We also highlight the presence of birds typical of rural areas (Vitorino et al. 2018), observed in the southernmost part of the EESA, due to territorial overlapping with a private property. Expansion of agriculture in this region may compromise important habitats, like the areas of open *cerrado* above 700 m and environments with rock outcrops present in this region.

As for species previously recorded at EESA but absent from our survey, we highlight *Columbina cyanopsis*, included in the secondary list. In all, documented records for this species are extremely rare, which underscores the importance of the reports at EESA even if undocumented. Only 8 preserved specimens are known: 5 specimens were collected in the Cuiabá region, state of Mato Grosso, from 1823 to 1825; another was collected in state of São Paulo in 1904 and 2 others in state of Goiás in 1940–1941 (Baptista et al. 2018). In 2015, a new population was discovered in state of Minas Gerais (Bessa 2016 oral presentation). Our sampling effort during the expeditions at EESA in an attempt to record this species is not sufficient to infer that it does not occur in the area. We also point out that during our searches, we still did not know the voice of the species, which was released in early 2018. We thus encourage new expeditions aimed at detecting and documenting its presence at EESA.

We also call attention to the high number of species included in the secondary list. Until our inventory, documenting the species found in EESA was not a priority, which compromises somewhat the robustness of our results. We suggest that the next studies carried out in the EESA give special attention to species documentation, for future updates of the consolidated list, using the same criteria adopted herein. We underscore that, from a biogeographical standpoint, EESA is situated in a very interesting area, since it constitutes the distributional limit for several Amazonian species and some taxa of south-central Brazil.

In regard to significant documentation obtained by us at EESA, we mention the rare species *Oxyruncus cris-*

tatus, previously recorded by Willis and Oniki (1990) and Valadão (2012). According to Brooke (2018), this species has an extremely disjunct distribution, occurring in parts of Colombia, Ecuador, Peru, Bolivia and Brazil. Gaps in the knowledge of its ecology and systematics persist, stemming from the difficulty of observing it in the field. This species is considered data deficient in Brazil (Pacheco et al. 2007). Considering the numerous records for *O. cristatus* at EESA, we consider that the region has great potential as a site for ecological and taxonomic studies of this species.

In short, we state that EESA harbors a bird community typical of an ecotone area, especially with regard to Amazonian and Cerrado species. The species that make up this community are distributed among the various protected habitats within the EESA. A noteworthy number of Threatened and Near Threatened species are present, which depend both on forest and savanna formations, in addition to several endemic and rare species. The information presented in this paper highlights the importance of EESA for the conservation of birds in southwest of the state of Mato Grosso. In this way, we stress the importance of expanding EESA, to ensure, in addition to a more efficient protection, also the inclusion of other habitats present in the Província Serrana.

Acknowledgements

We wish to thank the Environmental Sciences graduate program at UNEMAT, Cáceres campus; Coordenação de Aperfeiçoamento de Pessoal de Nível Superior for MSc scholarships granted to BDV and AVBF; Marcelo Andrade from the Instituto Chico Mendes de Conservação da Biodiversidade and team, for his support throughout the project; Vitor Piacentini, Luciano Faria, Marcelo Vasconcelos, João Pinho and Wilkinson Lázaro for valuable discussions about the work; LF, VP and Sidnei Dantas for helping to determine some species; the UNEMAT biology department undergraduates who accompanied us in some field expeditions; the agencies that provided us with licenses, especially SISBio/IBAMA for collection permits and CEMAVE for supplying us with bird bands; and the collection curators for their prompt assistance, especially at UFMT and MPEG.

Authors' Contributions

BDV: project conception, *in situ* data collection, species identification, compilation and review of occurrence records, and writing of the manuscript. AVBF: project conception, *in situ* data collection, species identification, and review of the manuscript. SKI and JRSN: review of the manuscript.

References

- Aleixo A, Guilherme E (2010) Avifauna da Estação Ecológica do Rio Acre, estado do Acre, na fronteira Brasil/Peru: composição, distribuição ecológica e registros relevantes. Boletim do Museu Para-

- ense Emilio Goeldi, Ciências Naturais 5 (3): 279–309.
- Baptista LF, Trail PW, Horblit HM, Boesman P, Sharpe CJ (2018) Blue-eyed Ground-dove (*Columbina cyanopis*). In: del Hoyo J, Elliott A, Sargatal J, Christie DA, de Juana E (Eds) Handbook of the Birds of the World Alive. Lynx Edicions, Barcelona. <https://www.hbw.com/node/54218>. Accessed on 2018-03-04.
- Bessa R (2016) Oral presentation. 11º Encontro Brasileiro de Observação de Aves, São Paulo, Brazil.
- Bibby CJ, Jones M, Marsden S (2000) Bird Surveys (Expedition Field Techniques Series). BirdLife International, Cambridge, 134 pp.
- BirdLife International and Handbook of the Birds of the World (2016) Bird Species Distribution Maps of the World. Version 6.0.
- Brazil (1994) Manual de Anilhamento de Aves Silvestres. 2nd ed. revista e ampliada. Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis, Brasília, 148pp.
- Brazil (2016a) Plano de Manejo Estação Ecológica da Serra das Araras. Ministério do Meio Ambiente. Brasília, 252 pp.
- Brazil (2016b) Sumário Executivo do Livro vermelho da fauna brasileira ameaçada de extinção. Instituto Chico Mendes de Conservação da Biodiversidade (ICMBio). Brazil: Ministério do Meio Ambiente (MMA), 75 pp.
- Brooke M (2018) Sharpbill (*Oxyruncus cristatus*). In: del Hoyo J, Elliott A, Sargatal J, Christie DA, de Juana E (Eds) Handbook of the Birds of the World Alive. Lynx Edicions, Barcelona. <https://www.hbw.com/node/56991>. Accessed on 2018-01-16.
- Carlos CJ, Straube FC, Pacheco JF (2010) Conceitos e definições sobre documentação de registros ornitológicos e critérios para a elaboração de listas de aves para os estados brasileiros. Revista Brasileira de Ornitologia 18 (4): 355–361.
- Cavalcanti RB (1999) Bird species richness and conservation in the Cerrado Region of Central Brazil. Studies in Avian Biology 19: 244–249.
- Cavarzere V, Moraes GP, Donatelli RJ (2009) Avifauna da Estação Ecológica dos Caetetus, interior de São Paulo, Brasil. Papéis Avulsos de Zoologia 49 (35): 477–485. <http://doi.org/10.1590/S0031-10492009003500001>
- D'Angelo Neto N, Venturin N, Oliveira-Filho, AT, Costa FAF (1998) Avifauna de quatro fisionomias florestais de pequeno tamanho (5–8 ha) no campus da UFLA. Revista Brasileira de Biologia 58 (3): 463–472. <http://doi.org/10.1590/S0034-71081998000300011>
- del Hoyo J, Elliott A, Sargatal J, Christie DA, De Juana E (2017) Handbook of the Birds of the World Alive. Lynx Edicions, Barcelona.
- Hassler ML (2005) A importância das Unidades de Conservação no Brasil. Sociedade & Natureza 17 (33): 79–89.
- Herzog SK, Kessler ME, Cahill TM (2002) Estimating species richness of tropical bird communities from Rapid Assessment Data. The Auk 119: 749–769. <http://doi.org/bw2xj3>
- Isler ML, Isler PR, Whitney BM (1997) Biogeography and systematics of the *Thamnophilus punctatus* (Thamnophilidae) complex. Ornithological Monographs 48: 355–381.
- IUCN (2017) The IUCN Red List of Threatened Species. International Union for Conservation of Nature and Natural Resources (IUCN). Version 2017-2. www.iucnredlist.org. Accessed on 2017-10-10.
- Karr JR (1981) Surveying birds with mist nets. Studies in Avian Biology 6: 62–67.
- Keyes BE, Grue CE (1982) Capturing birds with mist nets: a review. North American Bird Bander 7 (1): 2–14.
- Kottek M, Grieser J, Beck C, Rudolf B, Rubel F (2006) World map of the Köppen-Geiger climate classification updated. Meteorologische Zeitschrift 15 (3): 259–263. <https://doi.org/10.1127/0941-2948/2006/0130>
- Lopes LE, Pinho JB, Bernardon B, Oliveira FF, Bernardon G, Ferreira LP, Vasconcelos MF, Maldonado-Coelho M, Nóbrega PFA, Rubio TC (2009) Aves da Chapada dos Guimarães, Mato Grosso, Brasil: uma síntese histórica do conhecimento. Papéis Avulsos de Zoologia 49 (2): 9–47. <http://doi.org/10.1590/S0031-10492009000200001>
- Lopes LE, Pinho JB, Ortiz A, Evangelista MM, Silveira LF, Schunck F, Develey PF (2016) Birds from Cáceres, Mato Grosso: the highest species richness ever recorded in a Brazilian non-forest region. Revista Brasileira de Ornitologia 24 (2): 137–167.
- MacKinnon J (1991) Field Guide to the Birds of Java and Bali. Gadjah Mada University Press, 391 pp.
- Mallet-Rodrigues F (2008) Táxons de aves de validade questionável com ocorrência no Brasil. X—Oscines. Atualidades Ornitológicas 143: 8–9.
- Motta-Junior JC, Granzinolli MAM, Develey, PF (2008) Aves da Estação Ecológica de Itirapina, estado de São Paulo, Brasil. Biota Neotropica 8 (3): 207–227. <http://doi.org/cftrz2>
- Oniki Y, Oliveira DM (2002) Análise ecológica das aves capturadas na Estação Ecológica Serra das Araras, Mato Grosso, Brasil. Garcia de Orta, Série Zoologia 24: 1–6.
- Oniki Y, Willis EO (1999) Body mass, cloacal temperature, morphometrics, breeding and molt of birds of the Serra das Araras region, Mato Grosso, Brazil. Ararajuba 7 (1): 17–21.
- Pacheco JF, Kirwan GM, Aleixo A, Whitney BM, Whittaker A, Minns J, Zimmer KJ, Fonseca PSM, Lima MFC, Oren DC (2007) An avifaunal inventory of the CVRD Serra dos Carajás project, Pará, Brazil. Cotinga 27: 15–30.
- Payne R (2018) Pearly-breasted Cuckoo (*Coccyzus euleri*). In: del Hoyo J, Elliott A, Sargatal J, Christie DA, de Juana E (Eds) Handbook of the Birds of the World Alive. Lynx Edicions, Barcelona. <https://www.hbw.com/node/54892>. Accessed on 2018-01-16.
- Piacentini VQ, Aleixo A, Agne CE, Maurício GN, Pacheco JF, Bravo GA, Brito GRR, Naka LN, Olmos F, Posso S, Silveira LF, Betini GS, Carrano E, Franz I, Lees AC, Lima LM, Pioli D, Schunck F, Amaral FR, Bencke GA, Cohn-Haft M, Figueiredo LFA, Straube FC, Cesari E (2015) Annotated checklist of the birds of Brazil by the Brazilian Ornithological Records Committee / Lista comentada das aves do Brasil pelo Comitê Brasileiro de Registros Ornitológicos. Revista Brasileira de Ornitologia 23 (2): 91–298.
- Pinheiro ES, Durigan G (2009) Dinâmica espaço-temporal (1962–2006) das fitofisionomias em unidade de conservação do Cerrado no sudeste do Brasil. Revista Brasileira de Botânica 32(3) 441–454.
- Pinheiro RT, Dornas T (2009) Distribuição e conservação das aves na região do Cantão, Tocantins: ecótono Amazônia/Cerrado. Biota Neotropica 9 (1): 187–205.
- Roos AL (2010) Capturando aves. In: Matter SV, Straube FC, Accordi I, Piacentini V, Cândido Jr JF. Ornitologia e conservação: ciência aplicada, técnicas de pesquisa e levantamento. Technical Books, Rio de Janeiro, 295–312.
- Rosenzweig ML (1995) Species Diversity in Space and Time. Cambridge University Press, Cambridge, 436 pp.
- Save Brasil (2010) Relatório anual 2010. http://www.savebrasil.org.br/wp-content/uploads/2013/11/Relatorio-Anual-de-Atividades_SAVE-Brasil_2010.pdf. Accessed on 2018-02-27.
- Save Brasil (2011) Relatório anual 2011. http://www.savebrasil.org.br/wp-content/uploads/2013/11/Relatorio-Anual-de-Atividades_SAVE-Brasil_2011.pdf. Accessed on 2018-02-27.
- Sick H (1997) Ornitologia brasileira. 2nd ed. Nova Fronteira, Rio de Janeiro, Brazil, 912 pp.
- Silva JM, Oniki Y (1988) Lista preliminar da Avifauna da Estação Ecológica Serra das Araras, Mato Grosso, Brasil. Boletim do Museu Paraense Emilio Goeldi 4 (2): 123–143.
- Silva JMC (1995) Birds of the Cerrado region, South America. Steenstrupia 21: 69–92.
- Silva JMC, Bates JM (2002) Biogeographic patterns and conservation in the South American Cerrado: a tropical savanna hotspot. Bioscience 52 (3) 225–234.
- Silveira LF, D'Horta FM (2002) A Avifauna da região de Vila Bela da Santíssima Trindade, Mato Grosso. Papéis Avulsos de Zoologia 42 (10) 265–286. <http://doi.org/10.1590/S0031-10492002001000001>
- Somenzari M, Silveira LF, Piacentini VQ, Rego MA, Schunck F, Cavarzere V (2011) Birds of an Amazonia-Cerrado ecotone in Southern Pará, Brazil, and the efficiency of associating multiple methods in avifaunal inventories. Revista Brasileira de Ornitologia 19 (2): 260–275.
- Straube FC, Bianconi GV (2002) Sobre a grandeza e a unidade utilizada

para estimar esforço de captura com utilização de redes-de-neblina. *Chiroptera Neotropical* 8 (1–2): 150–152.

Valadão RM (2012) As aves da Estação Ecológica Serra das Araras, Mato Grosso, Brasil. *Biota Neotropica* 12 (3): 263–281.

Vasconcelos MF, Hoffmann D (2006) Os Bosques Secos Chiquitanos também são nossos! *Atualidades Ornitológicas* 130: 10–11.

Vitorino BD, Rodrigues MB, Frota AVB, Avelar DM, Rodrigues WL, Ikeda Castrillon SK, Nunes JRS (2018) Birds of rural landscape in the Midwest region of the state of Minas Gerais, Brazil. *Neotropical Biology and Conservation* 13 (1): 62–73 <http://doi.org/10.4013/nbc.2018.131.08>

Whitney BM, Isler ML, Bravo GA, Aristizábal N, Schunck F, Silveira LF, Piacentini VQ (2013) A new species of *Epinecrophylla* antwren from the Aripuanã-Machado interfluvium in central Amazonian Brazil with revision of the “stipple-throated antwren” complex. In: del Hoyo J, Elliott A, Sargatal J, Christie D (Eds) *Handbook of the Birds of the World. Special volume: new species and global index*. Lynx Edicions, Barcelona, 263–267.

Willis EO (2006) Protected cerrado fragments grow up and lose even metapopulational birds in Central São Paulo, Brazil. *Brazilian Journal of Biology* 66 (3): 829–837. <http://doi.org/10.1590/S1519-69842006000500008>

Willis EO, Oniki Y (1990) Levantamento preliminar das aves de inverno em dez áreas do sudoeste de Mato Grosso, Brasil. *Ararajuba* 1: 19–38.

Winkler H, Christie DA, Kirwan GM, Sharpe CJ (2018) Ringed Woodpecker (*Celeus torquatus*). In: del Hoyo J, Elliott A, Sargatal J, Christie DA, de Juana E (Eds) *Handbook of the Birds of the World Alive*. Lynx Edicions, Barcelona. <https://www.hbw.com/node/55418>. Accessed on 2018-01-16.

Züchner T, Kirwan GM, Boesman P (2018a) Dot-eared Coquette (*Lophornis gouldii*). In: del Hoyo J, Elliott A, Sargatal J, Christie DA, de Juana E (Eds) *Handbook of the Birds of the World Alive*. Lynx Edicions, Barcelona. <https://www.hbw.com/node/55418>. Accessed on 2018-01-16.

Züchner T, Kirwan GM, Boesman P (2018b) Frilled Coquette (*Lophornis magnificus*). In: del Hoyo J, Elliott A, Sargatal J, Christie DA, de Juana E (Eds) *Handbook of the Birds of the World Alive*. Lynx Edicions, Barcelona. <https://www.hbw.com/node/55420>. Accessed on 2018-01-16.

Appendix

Table A1. List of bird specimens collected at Estação Ecológica da Serra das Araras before the present study and deposited in scientific collections.

Taxon	English name	UFMT catalog no.	MPEG catalog no.
Accipitriformes Bonaparte, 1831			
Accipitridae Vigors, 1824			
<i>Rupornis magnirostris</i> (Gmelin, 1788)	Roadside Hawk		37785
Gruiformes Bonaparte, 1854			
Rallidae Rafinesque, 1815			
<i>Laterallus viridis</i> (Statius Müller, 1776)	Russet-crowned Crake	0033	
Columbiformes Latham, 1790			
Columbidae Leach, 1820			
<i>Claravis pretiosa</i> (Ferrari-Perez, 1886)	Blue Ground-Dove	0089, 0172	
<i>Leptotila verreauxi</i> Bonaparte, 1855	White-tipped Dove	0040	
Cuculiformes Wagler, 1830			
Cuculidae Leach, 1820			
<i>Crotophaga ani</i> Linnaeus, 1758	Smooth-billed Ani	0065	
<i>Tapera naevia</i> (Linnaeus, 1766)	Striped Cuckoo	0073	
Caprimulgiformes Ridgway, 1881			
Caprimulgidae Vigors, 1825			
<i>Hydropsalis torquata</i> (Gmelin, 1789)	Scissor-tailed Nightjar		37771
Apodiformes Peters, 1940			
Trochilidae Vigors, 1825			
<i>Glaucis hirsutus</i> (Gmelin, 1788)	Rufous-breasted Hermit	0903	37787
<i>Phaethornis nattereri</i> Berlepsch, 1887	Cinnamon-throated Hermit		37772
<i>Eupetomena macroura</i> (Gmelin, 1788)	Swallow-tailed Hummingbird	0071	
<i>Colibri serrirostris</i> (Vieillot, 1816)	White-vented Violetear	0055	
<i>Anthracothorax nigricollis</i> (Vieillot, 1817)	Black-throated Mango		37793
<i>Thalurania furcata</i> (Gmelin, 1788)	Fork-tailed Woodnymph	0059, 0086	37791
Coraciiformes Forbes, 1844			
Momotidae Gray, 1840			
<i>Momotus momota</i> (Linnaeus, 1766)	Amazonian Motmot	0034	37777
Galbuliformes Fürbringer, 1888			
Galbulidae Vigors, 1825			
<i>Brachygalba lugubris</i> (Swainson, 1838)	Brown Jacamar		37789
Bucconidae Horsfield, 1821			
<i>Nystalus chacuru</i> (Vieillot, 1816)	White-eared Puffbird	0051	
<i>Monasa nigrifrons</i> (Spix, 1824)	Black-fronted Nunbird	0072	
Piciformes Meyer & Wolf, 1810			
Ramphastidae Vigors, 1825			
<i>Pteroglossus castanotis</i> Gould, 1834	Chestnut-eared Aracari		37786

Taxon	English name	UFMT catalog no.	MPEG catalog no.
Picidae Leach, 1820			
<i>Melanerpes cruentatus</i> (Boddaert, 1783)	Yellow-tufted Woodpecker	0075, 0088	37781
<i>Veniliornis passerinus</i> (Linnaeus, 1766)	Little Woodpecker	0054	
Psittaciformes Wagler, 1830			
Psittacidae Rafinesque, 1815			
<i>Brotogeris chiriri</i> (Vieillot, 1818)	Yellow-chevroned Parakeet		37776
Passeriformes Linnaeus, 1758			
Thamnophilidae Swainson, 1824			
<i>Myrmophylax atrothorax</i> (Boddaert, 1783)	Black-throated Antbird		37782, 37783
<i>Formicivora rufa</i> (Wied, 1831)	Rusty-backed Antwren	0053	
<i>Thamnophilus pelzelni</i> Hellmayr, 1924	Planalto Slaty-Antshrike		37788
<i>Pyriglena leuconota</i> (Spix, 1824)	White-backed Fire-eye		37798
Dendrocolaptidae Gray, 1840			
<i>Sittasomus griseicapillus</i> (Vieillot, 1818)	Olivaceous Woodcreeper		37773
<i>Xiphorhynchus guttatoides</i> (Lafresnaye, 1850)	Lafresnaye's Woodcreeper	0067	37784
Furnariidae Gray, 1840			
<i>Furnarius rufus</i> (Gmelin, 1788)	Rufous Hornero		37796
<i>Synallaxis albescens</i> Temminck, 1823	Pale-breasted Spinetail		37775
Pipridae Rafinesque, 1815			
<i>Neopelma pallescens</i> (Lafresnaye, 1853)	Pale-bellied Tyrant-Manakin		37797
<i>Pipra fasciicauda</i> Hellmayr, 1906	Band-tailed Manakin	0035, 0077	37794, 37795
<i>Manacus manacus</i> (Linnaeus, 1766)	White-bearded Manakin	0049, 0069, 0094	
<i>Machaeropterus pyrocephalus</i> (Sclater, 1852)	Fiery-capped Manakin	0074, 0098	
Tityridae Gray, 1840			
<i>Tityra semifasciata</i> (Spix, 1825)	Masked Tityra	0888	
Rhynchocyclidae Berlepsch, 1907			
<i>Poecilotriccus latirostris</i> (Pelzelin, 1868)	Rusty-fronted Tody-Flycatcher	0090	
<i>Hemitriccus striaticollis</i> (Lafresnaye, 1853)	Stripe-necked Tody-Tyrant	0036	
Tyrannidae Vigors, 1825			
<i>Elaenia chilensis</i> Hellmayr, 1927	Chilean Elaenia	0080, 0081	
<i>Elaenia chiriquensis</i> Lawrence, 1865	Lesser Elaenia	0079	
<i>Myiopagis gaimardii</i> (d'Orbigny, 1839)	Forest Elaenia	0096	
<i>Phaeomyias murina</i> (Spix, 1825)	Mouse-colored Tyrannulet	0082	
<i>Attila bolivianus</i> Lafresnaye, 1848	Dull-capped Attila	0038	
<i>Myiarchus tyrannulus</i> (Statius Müller, 1776)	Brown-crested Flycatcher	0048	
Vireonidae Swainson, 1837			
<i>Cyclarhis gujanensis</i> (Gmelin, 1789)	Rufous-browed Peppershrike	0037, 0045	
<i>Vireo chivi</i> (Vieillot, 1817)	Chivi Vireo	0091, 0099	
Corvidae Leach, 1820			
<i>Cyanocorax cyanomelas</i> (Vieillot, 1818)	Purplish Jay	0083	37778
Troglodytidae Swainson, 1831			
<i>Campylorhynchus turdinus</i> (Wied, 1831)	Thrush-like Wren	0043, 0044	
<i>Pheugopedius genibarbis</i> (Swainson, 1838)	Moustached Wren	0047, 0097	
Turdidae Rafinesque, 1815			
<i>Turdus leucomelas</i> Vieillot, 1818	Pale-breasted Thrush	0039, 0062	
Mimidae Bonaparte, 1853			
<i>Mimus saturninus</i> (Lichtenstein, 1823)	Chalk-browed Mockingbird		37792
Icteridae Vigors, 1825			
<i>Gnorimopsar chopi</i> (Vieillot, 1819)	Chopi Blackbird	0060, 0061	
Thraupidae Cabanis, 1847			
<i>Neothraupis fasciata</i> (Lichtenstein, 1823)	White-banded Tanager		37779
<i>Cissopis leverianus</i> (Gmelin, 1788)	Magpie Tanager	0041, 0046, 0068, 0084	37774
<i>Schistochlamys melanopis</i> (Latham, 1790)	Black-faced Tanager	0058, 0078, 0085, 0746	
<i>Volatinia jacarina</i> (Linnaeus, 1766)	Blue-black Grassquit	0050, 0095	
<i>Tachyphonus rufus</i> (Boddaert, 1783)	White-lined Tanager	0063, 0066	
<i>Ramphocelus carbo</i> (Pallas, 1764)	Silver-beaked Tanager	0057	
<i>Tiaris fuliginosus</i> (Wied, 1830)	Sooty Grassquit	0064	
<i>Saltatricula atricollis</i> (Vieillot, 1817)	Black-throated Saltator	0070, 0076, 0093	
<i>Cypsnagra hirundinacea</i> (Lesson, 1831)	White-rumped Tanager		37780, 37790

UFMT = Universidade do Estado de Mato Grosso; MPEG = Museu Paraense Emílio Goeldi.